

Full Paper: Impacts of a Wellness-Focused First-Year Course on Student Retention and Academic Success

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Introduction

In the Western Michigan University (WMU) College of Engineering and Applied Sciences (CEAS), ENGR 2100, First-year CEAS Experience, is encouraged for all new beginner students. ENGR 2100 has been approved for inclusion in the WMU Essential Studies (i.e., general education) program in the category of Personal Wellness. The course has gone through several iterations – it was initially implemented as a two-credit first-year experience course as part of an NSF-funded initiative focused on students placing into Algebra II. In Fall 2022, it was significantly restructured to focus on personal wellness but enrollment was still restricted to low math placement students. Starting in Fall 2023, additional sections have been added and enrollment is open to all new students in the college (beginners and transfers), but it is especially encouraged for beginner students.

Specific sections of ENGR 2100 are still reserved for students with low math placement and the instructor for these sections is also the academic advisor for this cohort of students. CEAS uses cohort scheduling for beginner students during their first two semesters. As a result, ENGR 2100 was included as a potential cohort class for approximately half of new beginner students in the Fall 2023 semester (including all beginner students with low math placement). Students with low math placement (Algebra II), are placed in the Preparatory or PREP cohort. Half of the new beginner population had ENGR 2100 included as a potential cohort class for the Spring 2024 semester. Students (including those with low math placement) had the option to select another course in the Essential Studies program, rather than ENGR 2100, if they desired.

The student learning outcomes for ENGR 2100 are listed below.

- 1) Students will develop critical thinking, writing, technology, and research skills.
- 2) Students will demonstrate competency in accessing WMU resources and services and will make meaningful connections with faculty, staff, student leaders, and peers to facilitate success.
- 3) Students will understand the requirements to earn their bachelor's degree in CEAS.
- 4) Students will be aware of neuroscience-based learning tools and will understand responsible personal, academic, and social behaviors needed to be a successful student.
- 5) Students will create a personalized wellness plan highlighting the importance of emotional, environmental, financial, intellectual, occupational, physical, social, and spiritual wellness.
- 6) Students will develop skills in academic research and technical writing.
- 7) Students will develop a resume and elevator speech.
- 8) Students will understand the importance of financial planning.

ENGR 2100 is intended to include activities and discussions related to all aspects of the 'Eight Dimensions of Wellness Model' which has been adopted by WMU for wellness-related classes and programming [1], [2]. Table 1 lists the approximate percentages of classroom activities related to each dimension. Note that the percentages sum to more than 100% because some

activities span more than one wellness dimension. It is also important to note that it is quite possible that the specified dimensions overlap or confound each other to some degree – this continues to be an open question in the wellness literature [3] – [8].

Table 1: Approximate portion of ENGR 2100 topics relating to each wellness dimension [6], [7].

Wellness Dimension	Approximate Portion of Related Course Activities
Emotional	35%
Environmental	15%
Financial	20%
Intellectual	95%
Occupational	80%
Physical	20%
Social	35%
Spiritual	15%

Methods

Two electronic surveys were created using Qualtrics, one administered during the first ~3 weeks of the semester and one administered during the last ~3 weeks of the semester. Wellness-related questions in the surveys came from the Perceived Wellness Survey [9], [10] and the ICOPPE wellness scale [11], [12]. Additional questions on both surveys were added related to mindset [13] and self-efficacy (confidence in graduating from college and confidence in graduation from WMU). All new students in the CEAS were invited to participate in both the start-of-semester and end-of-semester survey administrations. Students could participate in one, both, or neither of the surveys (they did not have to have completed the start-of-semester survey to complete the end-of-semester survey). Respondents were entered into a gift-card drawing at the conclusion of each survey. Only results related to domestic first-time-in-any-college students (hereafter referred as ‘beginner’) are reported below. Statistical analysis (one-way ANOVA) was used to explore correlations between HS GPA, credits enrolled during the Fall 2023 semester, on-campus vs. off-campus residency during Fall 2023, survey responses, and academic outcomes (Fall 2023 GPA and retention to the Spring 2024 semester).

Overall, 345 beginner students were invited to participate in the surveys. Seventy-four participated in the start-of-semester survey, a response rate of 21.4%. One hundred sixty-one beginner students enrolled in ENGR 2100 during the Fall 2023 semester. Thirty-eight responded to the start-of-semester survey, a response rate of 23.6%. Fifty-two beginner students completed the end-of-semester survey (15.1%), but only 22 beginners completed both the start-of-semester and end-of-semester surveys (6.4%).

Discussion

Table 2 shows statistical correlations between high school GPA, the number of credits enrolled in the fall semester and whether students lived on campus during the fall semester with both Fall 2023 GPA and Spring 2024 retention. For all groups, the strongest correlation with first semester GPA was with high school GPA, with HS GPAs of 3.5-4.5 being generally correlated

with higher first semester college GPAs than HS GPAs of 2.5-3.49. High school GPA was not correlated to second semester enrollment for any of the beginner groups, however. The number of credits taken during the first semester was positively correlated with retention to the second semester with students enrolled in 12-15 credits generally being more likely to be retained (to the CEAS or WMU) than students taking less than 12 or more than 15 credits.

Table 2: Correlations with first semester GPA. ++ = positive correlation with 95% confidence interval; + = positive correlation with 90% confidence interval

	F23 GPA					S24 Retention			
	All Beginner	Beginner ENGR 2100	Beginner ENGR 2100 - PREP	Beginner Non-ENGR 2100		All Beginner	Beginner ENGR 2100	Beginner ENGR 2100 - PREP	Beginner Non-ENGR 2100
N	345	159	80	186		345	159	80	186
HS GPA	++	++	+	++					
1 st Sem Credits Enrolled	++			+		++	++	++	++
On-Campus Resident	+			+			++	+	

Raw results from the start-of-semester survey are shown in Table 3 for three groups of beginner students – those enrolled in any section of ENGR 2100, those enrolled in the preparatory (low math placement) sections of ENGR 2100, and those who did not enroll in ENGR 2100 during the Fall 2023 semester. Both average values and standard deviations (in parentheses) are shown for each group. Responses from the three groups are within statistical uncertainty of each other.

Wellness Composite scores can range from 4.8 to 28.8. Previous work by Adams et al. found Wellness Composite scores of 16.5 for college students in a health education major and corporate administrative employees and 15.3 for workers at two manufacturing plants [14]. While lower than those reported by Adams, the Wellness Composite values shown in Table 3 are consistent with values measured for similar groups of students during the Fall 2022 semester at WMU [15]. Raw scores for mindset and self-efficacy responses can range from 1-6. Raw scores for ICOPPE responses can range from 0-10. With the exception of the Wellness Composite score and the ICOPPE – Physical wellness score, average responses in Table 3 are in the upper half of each range for all groups.

Table 3: Comparison of average responses on the start-of-semester survey for beginner students enrolled in ENGR 2100, beginner students in the PREP sections of ENGR 2100, and beginner students not enrolled in ENGR 2100.

	Surveyed Beginner ENGR 2100	Surveyed Beginner ENGR 2100 - PREP	Surveyed Beginner non-ENGR 2100
N	38	20	36
Wellness Composite	13.49 (2.58)	13.31 (2.81)	13.19 (2.76)
Mindset	4.63 (0.83)	4.54 (0.95)	4.72 (0.80)
IC Overall	7.00 (1.20)	6.95 (1.31)	7.19 (1.43)

	Surveyed Beginner ENGR 2100	Surveyed Beginner ENGR 2100 - PREP	Surveyed Beginner non-ENGR 2100
IC Interpersonal	7.08 (1.98)	6.70 (2.12)	7.17 (1.78)
IC Community	6.36 (1.90)	6.30 (2.14)	6.57 (1.44)
IC Occupational	6.82 (1.44)	6.93 (1.58)	6.81 (1.68)
IC Physical	1.12 (0.29)	1.14 (0.28)	1.09 (0.29)
IC Psychological	6.07 (1.78)	5.73 (1.77)	6.24 (2.00)
IC Economic	5.45 (2.27)	5.23 (2.39)	5.72 (1.90)
Conf. Grad. College	5.34 (0.88)	5.15 (0.99)	5.58 (0.81)
Conf. Grad. WMU	5.00 (0.99)	4.90 (1.12)	5.25 (0.97)

For statistical analysis, the raw results were separated into distinct bins. For example, Wellness Composite scores in the range of 4.8-6.8 were coded as 1, 6.81-8.8 were coded as 2, etc. Coded responses scores ranged from 1-12, 1-5, and 1-11 for the Wellness Composite, mindset, and ICOPPE responses, respectively. Figure 1 shows changes in the average coded response for members of the same student groups as in Table 3 from the start-of-semester survey to the end-of-semester survey. Note that the samples sizes for Figure 1 are much smaller than for Table 3 because not every student completed both surveys.

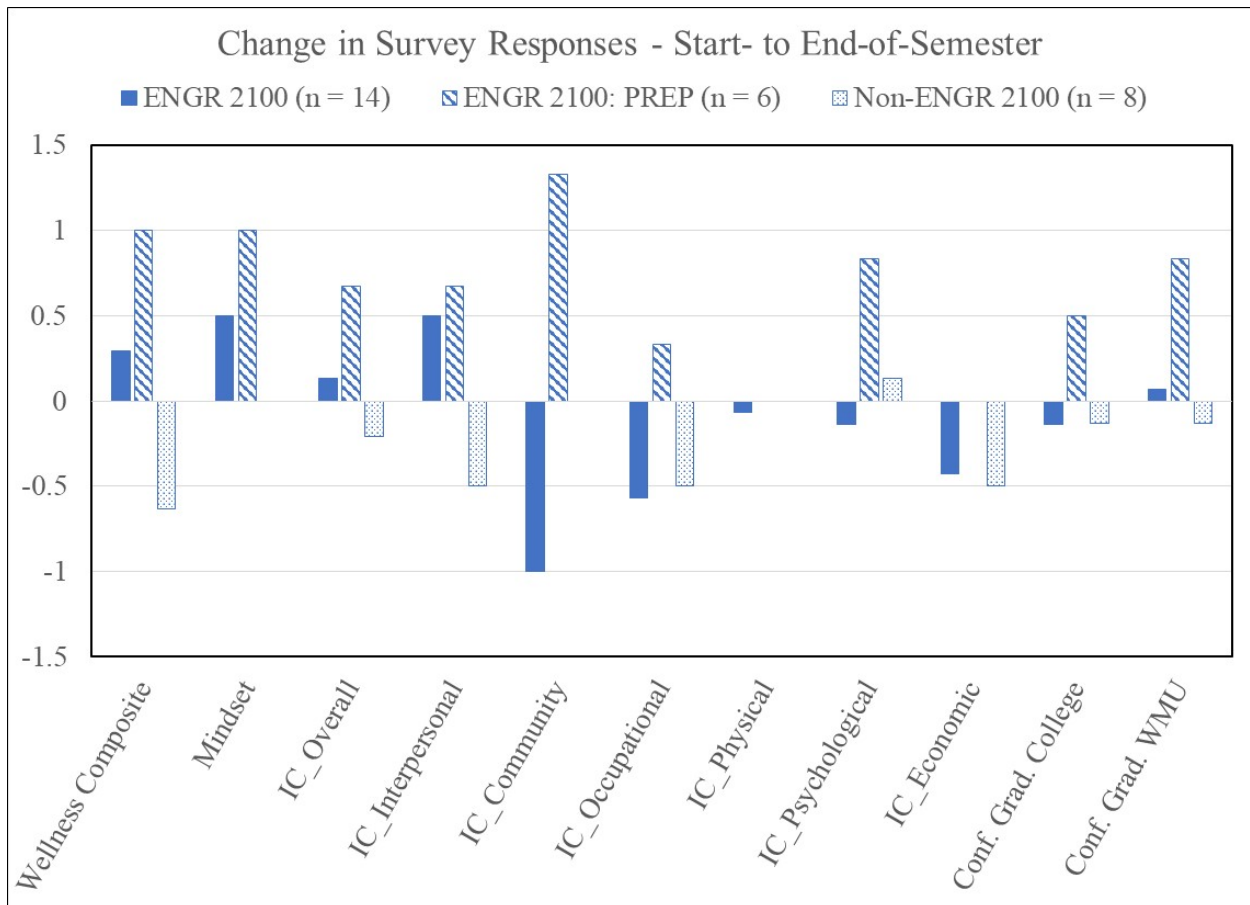


Figure 1: Comparison of changes in the survey responses between the start-of-semester survey and end-of-semester survey for beginner students enrolled in ENGR 2100, beginner students in the PREP sections of ENGR 2100, and beginner students not enrolled in ENGR 2100.

Figure 1 shows that changes in responses between the start and end of the semester were mixed for both the overall group of students in ENGR 2100 and the group of students not enrolled in ENGR 2100. For some survey items, students in ENGR 2100 reported a more positive change and, for some items, they reported a more negative change relative to students not enrolled in ENGR 2100. The differences between the responses of these two groups and the students in the preparatory (low math placement) sections of ENGR 2100 is stark – no negative changes in any survey items were reported for preparatory students. While the sample size is small (six students), the large difference in apparent impact for this group of students is remarkable, considering all three groups of students had approximately the same starting responses (Table 3).

Conclusions and Future Work

Comparisons between start-of-semester and end-of-semester survey results did not show consistent advantages with regards to perceived wellness, mindset, or self-efficacy for beginner students enrolled in ENGR 2100 compared to students who did not take the course. However, significant positive gains in almost all survey measures were reported for the subset of students enrolled in the preparatory (low math placement) sections of ENGR 2100. The authors hypothesize that three unique features of these sections may have contributed to the positive outcomes. First, most students enrolled in the preparatory sections of ENGR 2100 are also enrolled in ENGR 1002, a complement to Algebra II that focuses on applications of the math the students are learning. Second, the instructor of the preparatory sections of ENGR 2100 also serves as the academic advisor for students in those sections, resulting in additional touchpoints and contact outside of class. Finally, an upper-level undergraduate student served as a course assistant for these sections of ENGR 2100, available for both in-class problem sessions ENGR 1002), discussion participation (ENGR 2100), and Algebra II tutoring. These additional connections with faculty, staff, and students in CEAS may have played a key role in the increased perceived wellness of students in the preparatory sections of ENGR 2100. Future work will focus on creating additional opportunities for impactful engagement for all students in ENGR 2100 with the goal of improving the overall impact of the course on the personal wellness of students in the CEAS.

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