Integration of SDGs into the University General Education Curriculum

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Abstract

As universities take actions to support the achievement of the Sustainable Development Goals (SDGs), Yamaguchi University has focused in part on visibility, making information about which SDGs are taught in each class easily accessible on the online syllabi. This can be valuable data to students, but it is also important for the university to have a better understanding of how well these SDGs are integrated into classes and where there is room for improvement. This study investigated the extent that SDGs have been implemented into course syllabi in general education classes. SDG frequencies were investigated for both faculty and class type, and were found to be more frequent in English language courses, and of similar overall frequencies but varying compositions between faculties.

Keywords

Sustainable Development Goals (SDGs), Curriculum, English Education, Syllabi

1 Introduction

1.1 Universities and Sustainable Development

In 2015, the United Nations adopted the Sustainable Development Goals (SDGs), a set of 17 goals and 169 targets designed to lead the development of the world toward a more sustainable future. These goals have been taken up throughout the world, and through a wide variety of sectors. Although it may be difficult to achieve these goals by the target of 2030, especially after the setbacks during the coronavirus pandemic, they still stand as a critical guidepost for improvement.

Universities are widely considered to play a crucial role in the advancement of SDGs. Not only are they referenced specifically in Target 4.3, which calls for equal access for men and women to quality higher education, but they are also a key actor on several fronts. The United Nations expects action towards expanding human capital, research regarding how to best carry out plans for meeting the goals, and concrete actions from institutions, faculty, and students (Duran, n.d.). Sustainability depends on the ability of future generations to continue with and improve upon the progress of today, and higher education provides a foundation for students to

build the knowledge and skills that they will need.

The Japanese government has specifically designated universities as places that must raise technically skilled, globally minded students who can adapt to the needs of the region in a Central Council for Education (2018) plan for the future of education. Universities have taken a wide variety of steps toward this call for action, such as developing courses specifically aimed at preparing graduates to contribute to sustainable development, actively participating in SDG ranking systems like the Times Higher Education (THE) University Impact Rankings, and improving research collaboration to better address global issues (Ashida, 2023).

1.2 SDG Promotion at Yamaguchi University

Yamaguchi University is also doing its part to advance the SDGs. It has repeatedly ranked highly in the THE University Impact Rankings, domestically ranking in the top 20 overall, and even breaking into the top 5 for certain individual goals. A biennial SDG report details the many research, social contribution, and education activities that are carried out. The university is clearly dedicated to providing visibility to the SDGs and its actions to support them.

An important aspect of Yamaguchi University's strategy to make SDG efforts visible is the inclusion of relevant SDG goals on course syllabi. Implemented for several years now, professors are asked to select the goals that come up as topics in class. Students can get a better idea of the content of classes, and can even search for classes that cover specific SDGs.

This is a valuable resource for students, but also has the potential to provide a wealth of information to the university about the current state of sustainability education. Much like progress toward the SDGs is measured and tracked using the SDG targets and indicators, this syllabi data could be a useful metric for the university.

1.3 Factors Effecting the Integration of SDGs in Syllabi

Of the many SDG initiatives that universities may implement, Ramos Torres (2021) stated that education has the ability to yield the highest contribution to the attainment of SDGs. Thus, differences in which SDGs students encounter in classes could potentially have significant effects on their future achievement. In university education, the following two factors can be expected to cause differences in which SDGs are addressed.

1.3.1 Departmental Differences

In some cases, the SDGs that are addressed in university courses have been shown to vary depending on the faculty or department holding the courses. For example, Chaleta et al. (2021) found significant differences in the number of classes addressing different goals, as well as the distribution of goals across different departments. Elmassah et al. (2020) similarly showed that students'

SDG competencies varied between departments. While the exact reasons for these differences were not proved, the effect of differences in the formal education received is suggested as one.

1.3.2 Language and SDGs

Another factor that could potentially influence the adoption of SDGs as a topic in class, is the innate connection between language and SDGs. For example, Ezeh & Obiageli (2020) emphasized the importance of language to the SDGs throughout the development process, from their conception, communication and understanding, to the actual implementation and review. Meetings of the "Language and Development Conference" have reaffirmed that communication is essential for development, calling for improvement of multilingualism and further inclusion of language within the indicators (Harding-Esch & Coleman, 2021).

While many sources cite language in general as important, within the context of the Japanese university, the English language, and thus the English classroom should be considered an important gateway to the international community. Unlike other university foreign language classes, thanks to the English education required in Japan from elementary school, students start at a more intermediate level, allowing discussion of more complicated topic matter. Furthermore, a focus on improving English skills as a communication tool means that a wide range of topics can allow both communication practice and topic-based learning to occur simultaneously.

1.4 Research Questions

Based on these considerations, this study aims to examine the distribution of the SDGs in the university's education, using the available syllabus data. Which goals are taught? Is there a difference between which goals students of different faculties have access to? And is there a difference in the SDGs offered specifically in English language classes? Based on the answers to these questions, this study aims to determine the current baseline for SDG education in general education classes. This can be used to confirm the starting point for all students, and also evaluate how their education changes as they progress into more specialized studies.

2 Methods

Information about the courses offered in general education in the 2023 school year was obtained through the online syllabus database. This data included each course's name, target students, and whether or not each of the 17 SDGs was marked as a topic covered in the class. Courses were then categorized into English education and other courses based on the course descriptions, and also by faculty based on the target students.

T-testing and ANOVA testing was carried out in SPSS to determine whether there was a significant difference between the number of SDGs taught in different departments. Furthermore, chi-squared tests were carried out to more closely interpret the integration of individual SDGs, examining the significance of differences in whether each individual

SDG was taught in different departments and in English courses versus other courses.

3 Results and Discussion

3.1 Overview of Curriculum Integration

Of the 1053 listed class syllabi, 76.8% of the courses reported addressing at least one SDG in class. The mean number of SDGs addressed in a course was 2.67, with a standard deviation of 3.67. The median number of SDGs addressed in a course was 2.

3.2 Curriculum Integration by Goal

The number of classes teaching each goal can be seen in Figure 1, where several goals stand out as being more or less frequently integrated into curriculums. In particular, Goal 4: Quality Education, was present in 582 courses. The two next most popular, Goal 3: Good Health and Well-Being and Goal 5: Gender Equality were only present in 208 and 200 classes respectively. The exceptionally high rate of inclusion of Goal 4 can be attributed to the fact that any type of class can be related to education and can provide a potential base for lifetime learning. However, it also reveals a potential weakness in the reporting system. In undergraduate courses in the School of Social Sciences at the University of Évora, the university considers all courses to be pertaining to education and automatically marks Goal 4 for all classes (Chaleta et al., 2021). This contrast raises questions about what standards should be used for the inclusion of goals.

On the lower end, Goal 2: Zero Hunger, and Goal 14: Life Below Water both fell below 100 cases at 84, and 94 respectively. The rest of the goals were all addressed in between 100 and 200 classes. Although not all goals are addressed with equal frequency, no goals are completely neglected.

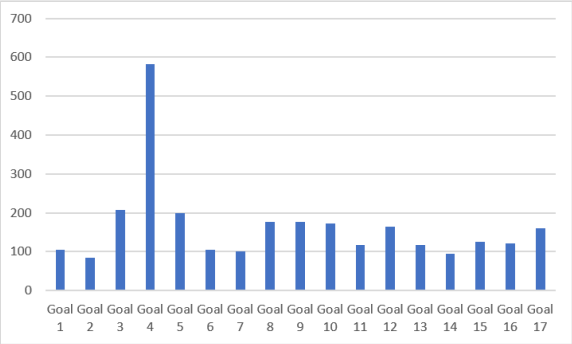

Figure 1 Classes Teaching Each SDG

3.3 Curriculum Integration by Department

The differences between the total number of SDGs taught for each Faculty was not found to be significant in the one-way ANOVA test (p =.133). Although this contrasts with what might be expected based on the results of other universities, it indicates that general education is doing its job to provide a common education to students.

Cross-tabulation of whether an individual goal was taught in classes designated for each faculty, however, showed significant differences in the distribution between faculties for several goals. Table 1 displays the number of classes that teach each SDG for specific faculties, mixed groups of students, and in classes without specific

Table 1 Differences in Distribution of SDGs by Department

		Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7	Goal 8	Goal 9	Goal 10	Goal 11	Goal 12	Goal 13	Goal 14	Goal 15	Goal 16	Goal 17
Agriculture	N	5	8	10	20	5	6	6	7	4	6	3	6	9	6	9	4	6
	%course w/SDG	12.2%	19.5%	24.4%	48.8%	12.2%	14.6%	14.6%	17.1%	9.8%	14.6%	7.3%	14.6%	22.0%	14.6%	22.0%	9.8%	14.6%
Economics	N	12	9	16	61	23	11	8	19	16	21	12	17	12	9	13	16	21
	%course w/SDG	10.8%	8.1%	14.4%	55.0%	20.7%	9.9%	7.2%	17.1%	14.4%	18.9%	10.8%	15.3%	10.8%	8.1%	11.7%	14.4%	18.9%
Education	N	6	4	14	55	15	5	6	8	10	11	4	12	6	5	6	7	9
	%course w/SDG	7.9%	5.3%	18.4%	72.4%	19.7%	6.6%	7.9%	10.5%	13.2%	14.5%	5.3%	15.8%	7.9%	6.6%	7.9%	9.2%	11.8%
Engineering	N	15	11	31	100	32	28	33	34	53	24	27	39	30	21	32	19	34
	%course w/SDG	6.4%	4.7%	13.3%	42.9%	13.7%	12.0%	14.2%	14.6%	22.7%	10.3%	11.6%	16.7%	12.9%	9.0%	13.7%	8.2%	14.6%
Exchange	N	0	0	3	46	6	2	0	8	0	8	0	2	2	0	2	0	2
	%course w/SDG	0.0%	0.0%	5.2%	79.3%	10.3%	3.4%	0.0%	13.8%	0.0%	13.8%	0.0%	3.4%	3.4%	0.0%	3.4%	0.0%	3.4%
Humanities	N	9	8	9	40	19	8	5	9	11	9	9	9	10	9	12	6	14
	%course w/SDG	15.3%	13.6%	15.3%	67.8%	32.2%	13.6%	8.5%	15.3%	18.6%	15.3%	15.3%	15.3%	16.9%	15.3%	20.3%	10.2%	23.7%
Medicine	N	8	8	20	48	17	6	11	11	9	9	9	11	8	5	8	5	12
	%course w/SDG	9.6%	9.6%	24.1%	57.8%	20.5%	7.2%	13.3%	13.3%	10.8%	10.8%	10.8%	13.3%	9.6%	6.0%	9.6%	6.0%	14.5%
Science	N	7	7	14	35	14	8	7	11	11	12	8	12	11	11	12	9	16
	%course w/SDG	9.9%	9.9%	19.7%	49.3%	19.7%	11.3%	9.9%	15.5%	15.5%	16.9%	11.3%	16.9%	15.5%	15.5%	16.9%	12.7%	22.5%
Veterinary	N	2	2	3	3	1	2	3	0	1	0	1	3	2	3	2	0	0
	%course w/SDG	22.2%	22.2%	33.3%	33.3%	11.1%	22.2%	33.3%	0.0%	11.1%	0.0%	11.1%	33.3%	22.2%	33.3%	22.2%	0.0%	0.0%
Mixed	N	31	17	69	123	51	20	14	43	32	50	31	37	16	14	16	38	29
	%course w/SDG	13.9%	7.6%	30.9%	55.2%	22.9%	9.0%	6.3%	19.3%	14.3%	22.4%	13.9%	16.6%	7.2%	6.3%	7.2%	17.0%	13.0%
Open	N	9	10	19	51	17	9	8	26	29	23	14	16	11	11	13	17	18
	%course w/SDG	10.1%	11.2%	21.3%	57.3%	19.1%	10.1%	9.0%	29.2%	32.6%	25.8%	15.7%	18.0%	12.4%	12.4%	14.6%	19.1%	20.2%
Total	N	104	84	208	582	200	105	101	176	176	173	118	164	117	94	125	121	161
	Average % w/SDG	9.9%	8.0%	19.8%	55.3%	19.0%	10.0%	9.6%	16.7%	16.7%	16.4%	11.2%	15.6%	11.1%	8.9%	11.9%	11.5%	15.3%
X^2 for each goal cross-tabulated with faculty	X^2	17.67	23.56	37.07	44.52	17.86	9.23	24.04	16.95	39.76	22.78	15.13	9.93	18.23	25.28	22.26	27.15	18.57
	df	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	p	0.061	0.009**	<.001***	<.001***	0.057	0.51	0.008	0.076	<.001***	0.012*	0.127	0.447	0.051	0.005**	0.014*	0.002**	0.046*

student designation. The numbers of classes that do not teach each goal is omitted. SDGs that did not show a significant difference and are taught similarly throughout the faculties are highlighted in gray.

Although there was not an overall difference in the number of goals addressed, faculty-dependent specialization of focus is apparent for some goals. For example, Goal 2: Zero Hunger, was touched on in a significantly higher percentage of veterinary (22.2%) and agriculture (19.5%) classes, while being almost nonexistent in education (5.3%) and engineering (4.7%) classes, $X^2 = (10, N = 1053) = 23.56$, $p = .009$. On the other hand, Goal 16: Peace, Justice, and Strong Institutions is seen significantly more frequently in classes of mixed and open composition. Goal 4: Quality Education is the only goal taught to exchange students with particularly higher frequency (79.3%), and is followed by faculty of education classes (72.4%) predictably matching the goals of the faculty. In general, the frequency of each SDG in open classes is near or above the average for all classes, so it appears that the university is providing opportunities for all students to learn broadly about the goals, while simultaneously allowing students to start focusing on some of the goals that will be more relevant to their future studies.

3.4 Curriculum Integration by Language

Finally, the difference in SDG integration between English learning courses and other courses was examined. A significant difference between the number of SDGs taught in English classes as compared to other classes was observed, with English classes addressing on average approximately 1 more SDG than other classes (Table 2).

Table 2 Difference between English and Other Courses

	N	Mean	Std. Dev.	*p*
English Classes	331	3.38	5.08	<.001***
Other Classes	722	2.34	2.74	

As shown in Figure 2, there is a clear difference between the frequency of SDGs as subject matter in English courses compared to the rest of classes. There also appears to be some variation in which topics are more common, such as with Goal 17: Partnership for the Goals, which seems to be particularly more common in English classes. This could potentially be attributed to the importance of English in achieving this goal, considering that it references global partnership.

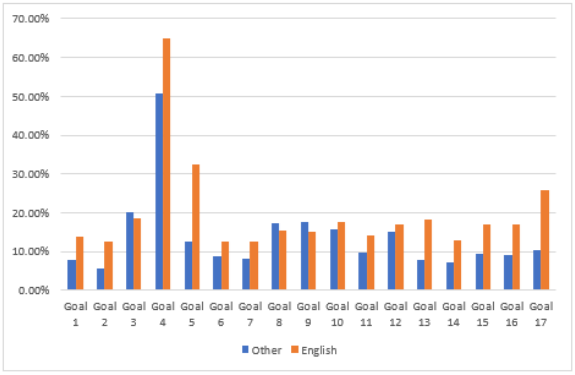

Figure 2 Percent of English Classes and Other Classes Teaching SDGs

The differences are examined in more detail in Table 3, which again shows sections of the combined data from cross tables comparing goals taught in English classes and other classes. Goals without a significant difference are highlighted in gray. The goals that are taught equally across classes seem to cluster primarily around the more economically focused goals, as opposed to goals related to people or the planet.

Table 3 Difference between English Courses and Others

		Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7	Goal 8	Goal 9
English	N	46	42	62	215	108	42	42	51	50
	%	13.9%	12.7%	18.7%	65.0%	32.6%	12.7%	12.7%	15.4%	15.1%
Other	N	58	42	146	367	92	63	59	125	126
	%	8.0%	5.8%	20.2%	50.8%	12.7%	8.7%	8.2%	17.3%	17.5%
Total	N	104	84	208	582	200	105	101	176	176
	%	9.9%	8.0%	19.8%	55.3%	19.0%	10.0%	9.6%	16.7%	16.7%
X^2 for each goal cross-tabulated with language	X^2	8.77	14.60	0.32	18.31	58.33	3.97	5.34	0.59	0.90
	df	1	1	1	1	1	1	1	1	1
	p	0.003**	<.001***	0.573	<.001***	<.001***	0.046*	0.021*	0.442	0.344

		Goal 10	Goal 11	Goal 12	Goal 13	Goal 14	Goal 15	Goal 16	Goal 17
English	N	58	47	56	61	43	56	56	85
	%	17.5%	14.2%	16.9%	18.4%	13.0%	16.9%	16.9%	25.7%
Other	N	115	71	108	56	51	69	65	76
	%	15.9%	9.8%	15.0%	7.8%	7.1%	9.6%	9.0%	10.5%
Total	N	173	118	164	117	94	125	121	161
	%	16.4%	11.2%	15.6%	11.1%	8.9%	11.9%	11.5%	15.3%
X^2 for each goal cross-tabulated with language	X^2	0.4	4.3	0.7	26.2	9.8	11.8	14.0	40.2
	df	1	1	1	1	1	1	1	1
	p	0.517	0.037*	0.415	<.001***	0.002**	<.001***	<.001***	<.001***

4 General Discussion

This study chose to focus on general education courses in order to gain a better sense of what common base in SDG education was being provided to students. The high percentage of classes dealing with SDG topics provides students with a wide variety of opportunities to increase their knowledge and connection to the sustainable development goals, while also slowly moving students toward topics that fit well with the specialized topics they will study in their faculty.

This information can serve as a benchmark for the university, both while tracking the development of students' studies as they progress through their majors, and also as the university continues efforts to further integrate SDGs and promote action to achieve them. As the university takes these steps, it is important to examine the needs and interests of the students and ensure that the current class provisions are meeting these needs.

One concern with this data is that the syllabus entries are entrusted entirely to the professors, with little guidance on what level of SDG discussion should be

considered as inclusion as a class topic. Neither is there a confirmation of learning outcomes or student awareness of the SDGs' inclusion in the class. As SDG rating systems improve, some are starting to differentiate between how much focus is actually placed on the SDGs in class. For example, the Association for the Advancement of Sustainability in Higher Education's (2023) Sustainability Tracking Assessment and Rating System (STARS) divides classes into sustainability-focused or sustainability-supportive classes. It is unclear which case professors consider for the syllabi at Yamaguchi University, and opinions may differ from professor to professor. While even weak connections to SDGs may be beneficial in emphasizing the interconnectedness of the goals, actual student recognition of the tie-in should be confirmed in order to better understand what students consider to be identifiable integration of SDGs in the classroom.

（教育支援センター　助教）

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