Ranking Japan's Institutions of Higher Education, 2017: A Comparative Analysis

Kenneth M. Cramer
kcramer@uwindsor.ca

Hyein Yoo
yoo1@uwindsor.ca

Dana Manning
manningd@uwindsor.ca

Department of Psychology, University of Windsor, Windsor, On., Canada.

Received: 29 July 2019
Accepted: 21 November 2019
First Published Online: 18 December 2019
Published: 26 December 2019

ABSTRACT

The present study examined the 2017 Times Higher Education annual rankings for Japanese institutions of higher learning. Based on the analytic model as mapped out previously using Canadian data, we offered a similar protocol for the top 100 institutions of higher education in Japan. Three analyses showed that: (a) overall rank correlated with individual index ranks for 9 of the 13 indices, (b) the schools appearing among the top institutions overall ranked significantly better on 8 of the 13 indices compared to schools appearing among the bottom institutions overall, and (c) schools were empirically grouped into four meaningful families or clusters whose constituent members shared a comparable profile of indices. We offer a juxtaposition of the present results to annual evaluations from Canada's institutions of higher learning. The wider implications include an international comparison of institutions of higher learning, a proposed analysis protocol that Japanese education administrations may further pursue, and a categorical breakdown of educational institutions in Japan. Directions for future research are outlined.

KEYWORDS: *Japan, University Ranks, Higher Education, Cluster Analysis*

INTRODUCTION

The exercise of ranking various entities in our world – from toasters to celebrities – has entered the realm of higher education (Amsler & Bolsmann, 2012; Axelrod, 2010; Boyer, 2003; Bruneau, 2006; Cramer et al., 2016; Ishikawa, 2009, 2014; Li, 2016; Post, 2012; Yonezawa, 2010). Of course, the legacy of low-impact decisions, like brand of chewing gum, are hardly salient; it is rather the high-impact decisions – such as home ownership, automobile purchase, and institutions of higher education – that may last years, even decades. In higher education specifically, many students turn to trusted authorities upon which to base their decision of sustained enrolment. One online resource – *Times Higher Education* – offers annual evaluations of higher education institutions in Europe, North and South America, and Asia. The present study provides an empirical assessment of the ranked indices available to students looking to enroll in Japan's institutions of higher learning to determine, using a protocol of analysis based on Canadian data, whether they are valid, meaningful, and suitably informative.

Japan's Institutions of Higher Education

As Li (2016) outlines, Japan's higher education system has almost exclusively evolved into the corporate realm, where schools are operated as corporate models under the auspice of the National University Corporation. Japanese institutions of higher learning (predominantly private) are monitored by the Ministry of Education, Culture, Sports, Science, and Technology (MEXT), who provide 6-year plans and both short- and long-range targets for institutions to meet and maintain. Midterm progress toward prescribed benchmarks is evaluated, and any future plans and/or redirections necessarily require MEXT approval. Annually, institutional performances are then submitted (for review) to the National Institution for Academic Degrees and Quality Enhancement of Higher Education, mandated to evaluate each institution's research standing according to these short- and long-term educational benchmarks as requested from the National University Corporation Evaluation Committee. With two key goals in mind – public accountability and quality assurance/improvement – MEXT ties annual institutional funding onto the school's ability to meet its prescribed targets for research productivity and teaching performance (Shimmi & Yonezawa, 2015).

However, this move toward wide-reaching corporate-style top-down micro-management has proven unsettling to many (Chou, 2014; Eagleton, 2015; Hazelkorn, 2015), who fear the mounting pressure on institutions (to produce more research and obtain more lucrative grants) weighs heavily on both faculty and administration in a bitter inter-university competition over limited resources. As Li (2016, p. 14) writes: "within just one decade the global ranking regime has overtaken [the] traditional factors, and become a pervasive, phenomenal and powerful force that systematically controls higher education almost everywhere in the globe."

Although greater transparency and accountability in university funding is arguably relevant, the indices by which students and parents select their school of higher education for long-term enrolment is derived chiefly from more readily available online sources. *Times Higher Education* publishes annual rankings for institutions of higher learning from various parts of the world including Japan (2017a). We ask presently the extent to which those indices are valid and meaningful so as to properly inform its consumers. In comparison, we offer an outline of a protocol analysis conducted annually in Canada based on their primary public release of institutional data using similar indices of teaching, research, and student life.

Institutional Ranks in Canada

We offer the reader the following example from Canada, where researchers have successfully navigated a plethora of data provided annually by *Maclean's Magazine* on 49 institutions of higher education. Institutions are grouped into one of three categories: (1) Medical/Doctorate schools [15 in total] offer full medical and/or dentistry programs as well as a host of graduate and doctoral degrees across many subjects; (2) Comprehensive schools [13] offer professional training and some doctoral programs in certain subjects; and (3) Primary Undergraduate schools [21] focus chiefly on the undergraduate experience though some may offer limited graduate training in only a few subjects.

Schools are ranked according to a series of indices (performance indicators), including research grants obtained, student/faculty ratio, proportion of international students, average incoming grades, etc. The exercise, according to *Maclean's Magazine*, should help inform students and parents as to which school is more likely to produce 'the leaders of tomorrow.' Schools have been discovered to take questionable risks toward improving their own ranks. Consider the case of the University of British Columbia in Western Canada, who in 2004 admitted they had deliberately manipulated both the percentage of classes taught by tenured professors and class sizes (to appear smaller than they really were) in an effort to improve their national ranking (Bruneau, 2006).

Since analysis of *Maclean's* rankings began in 1993, researchers have consistently cast doubt on the validity and utility of these data (see Cramer et al., 2016 for review). Their analyses branch off in three directions. First, researchers calculate the Spearman rho correlation between the overall rank of the school and their rank on a given index – presumably, higher-ranked schools should correlate with higher-ranked indices, for the most part (in essence, adults have larger feet, hand-span, head circumference, elbow-to-wrist length, etc. than children). Canadian researchers instead find that most indices do not significantly correlate with the final overall rank; moreover, there are several instances of negative correlations – wherein higher-ranked schools (often larger in enrolment) may rank low on certain student-experience indices such as teaching effectiveness (to return to our analogy, this would suggest the instance of small children with very large feet).

Second, within each of the three institutional categories (medical/doctorate, comprehensive, undergraduate), researchers compare the mean rank of those indices for schools in the upper half to those in the lower half; presumably, higher-ranked schools should have higher-ranked constituent indices. Canadian researchers instead found no difference between higher- and lower-ranked schools on most of the performance indicators.

Finally, researchers utilize the full set of indices to conduct a cluster analysis, which sorts institutions into like-profiled families, where the constituent members share a similar set of performance indicators. Canadian results consistently show an incomprehensible melange of schools, whose pattern is scarcely different from a random assortment. That is, high-ranking medical/doctorate schools are grouped with both comprehensive and undergraduate schools of vastly different characteristics. As such, Canadian researchers concluded that the cluster analysis cannot offer students and parents a meaningful and useful guide toward selecting their school of higher education (Cramer et al., 2016).

Present Study

Given the groundwork laid in the Canadian arena, we offer a comparable analysis of Japanese institutions for higher learning as provided by *Times Higher Education* (2017a). Presumably, if the Japanese data are valid and meaningful, they should withstand the scrutiny of three branches of analyses as prescribed from the Canadian protocol.

METHOD

Sample

Times Higher Education (2017b) publishes a series of university rankings, divided into various world regions including Europe, North and South America, and Asia. We selected the 2017 data of 292 institutions of higher education in Japan. Although the list appeared somewhat comprehensive, we noted considerable missing data throughout the table which became particularly pronounced after the 100th entry (sorted by rank, where lower numbers are consider better schools, much like ordinal race placements – 1st, 2nd, 3rd, etc.). We further contacted those schools (among the top 100) to supplement any missing data, and we derived the information for any missing data found on that school's webpage.

Performance Indicators (Indices)

A total of 13 indices were provided by *Times Higher Education* on the relative rank of each institution of higher learning. As divided into five broader categories, we outline the constituent measures and include a breakdown as to their relative contribution to the overall rank.

(1) *Resources* (the largest contributor to overall rank) is derived from the four constituent measures of (a) institutional finance or income spent on each student (as *Times* notes: 'does the institution have the money to effectively deliver teaching'); (b) ratio of students to faculty (i.e., 'does the college have enough teachers'); (c) scholarly output; (d) research grants wherein experts in a given field are believed to enhance a student's educational experience; and (e) entrance scores (academic calibre to gain admission). This category accounts for 38% of an institution's final score, broken down into finances (10 points), ratio (8), research output (7), research grants (7), and entrance scores (6). We further note that *Times* only provided the data for the constituent variable of ratio and the summary variable of Resources.

(2) *Engagement* is based on the results of the High School Advisory Survey as completed by student career advisers or guidance counselors from approximately 2400 Japanese high schools. Advisors name the top 15 universities they believe teach students to the highest: (a) global standards, and the 15 universities they believe are best at developing (b) students' abilities. This category contributes 26 points to the institution's final

score, divided evenly at 13 points each (*Times* reported only the summary Engagement score).

(3) *Outcomes* is a reputational category seen from the perspective of both (a) academics and (b) employers. In the first perspective, leading Japanese scholars complete the *Academic Reputation* Survey to indicate which institutions have the best reputations for excellence in teaching (worth 13 of 20 points). In the second perspective, a school's reputation is rated by human resource departments from almost 600 publicly listed companies. They identify what they believe to be the 10 best universities in Japan based on the strengths of employees from those institutions. They then complete a set of questions for each of the 10 universities identified, rating employees in several areas (7 of 20 points; *Times* reports only the summary Outcomes score).

(4) *Environment* constitutes the general ethnic and cultural profile of both (a) students and (b) faculty/staff at a given institution, which inform students as to whether they will find a diverse, supportive, and inclusive environment therein. Many students indeed seek out this multicultural environment so as to appreciate different perspectives on important personal, community, and world issues. Measures include the proportion of international students within the student body, and the proportion of international faculty and staff (each contributing 8 points to the final total; *Times* reports both of these constituent measures along with the summary Environment score).

(5) *Ancillary Measures* included (a) school enrolment, the extent to which students at the institution were likely to study abroad for a (b) short-term or (c) long-term time period; (d) the percentage of classes taught in English, (e) students' perceptions that the school fosters an active learning environment, and (f) the institution's guidance toward students' career decisions.

We noted a sizeable and differential pattern of missing data by category. For instance, the Environment category was complete for only 56 of the 100 institutions, Ratio for 64, Resources for 83, English Instruction for 85, and Active Learning for 92. These levels were achieved following supplementation either online or by contacting the schools directly; trace data attrition was observed among the remaining variables.

RESULTS

Using a significance level (α) of .05, we present a Spearman rho (rank) correlation table of all variables (Table 1 also includes means, standard deviations, and both skewness and kurtosis statistics). Modelled after past research (Cramer et al., 2016), we divided the main nonparametric (rank) analysis into three branches: (1) an assessment of the correlation between each index rank and the final rank, (2) a comparison for each index by lower- versus higher-ranking schools, and (3) a cluster analysis to group like-profiled schools into a family or cluster of constituent members who share similar index scores.

We began by evaluating the correlation between each school's index rank and their overall rank; presumably better-ranked schools would score higher on individual indices. Using a Spearman rho correlation, results showed that overall institutional rank correlated significantly with ranks for 9 of the 13 indices: Resources, Engagement, Outcomes, Environment, proportion of international students and staff, enrolment, short-term study abroad, and English instruction. Using a Bonferroni correction to prevent inflated risk of Type-I errors from multiple testing, the α shrank to .05/13 = .0038; all but enrolment remained significant (p = .017).

Secondly, we conducted a nonparametric Mann-Whitney U-test (related to a *t*-test) to compare the top half to the bottom half of the ranked institutions to identify significant differences by index; presumably, institutions ranked well overall should out-perform those poorly ranked institutions on any given index. Results in Table 2 show significant differences for 8 of 13 indices: Resources, Engagement, Outcomes, Environment, international students and staff, short-term study abroad, and English instruction. Using the Bonferroni correction (α = .0038), all but two indices (Resources, p = .016; and English instruction, p = .031) remained significant.

Finally, we conducted a cluster analysis to determine which schools joined into families or clusters most similar in their profile of index scores. In an effort to maximize instructional inclusion, we elected to eliminate several institutions with missing values. That is, 28 institutions had full profiles which included all 13 indices, 44 institutions had full profiles with 12 indices, and 76 institutions had full profiles with 11 indices; we selected this final configuration (excluding both Environment and Ratio) so as to maximize school inclusion in the analysis. Using algorithms outlined by Ward (1963), squared Euclidian distances served as estimates of distance between schools for 76 of the 100 schools based on their raw scores per the aforementioned indices. Unique clusters of schools were identified, in which the similarity of each member's corresponding profile was maximized, and intercorrelations among members were high. Schools were thus highly similar to schools found within their respective cluster, but dissimilar to schools outside their cluster. Results in Table 3 show 4 main clusters, three of which subdivided into subcluster pairs (viz. Cluster-A into A1 and A2). A Welsh ANOVA (to account for unique group variances) was used to identify the unique characteristics of the clusters (Table 4), followed by Ryan-Einot-Gabriel-Welch (Einot & Gabriel, 1975) multiple comparison *F*-tests that would further discriminate among the clusters. The four clusters appear as follows:

Consisting of 14 institutions split into two subclusters, ***Cluster-A*** institutions or top-tiered schools were typified by high overall ranks in enrollment, resources, proportion of international students, engagement, outcomes, and attention to career options; these schools ranked moderately for English instruction. Constituent schools included Tokyo and Kyoto in subcluster-1, and Hiroshima and Waseda in subcluster-2.

Consisting of 11 institutions with no subclusters, ***Cluster-B*** institutions may be viewed as especially efficient, showcasing moderate overall scores based on higher enrolment, engagement, and English instruction; but with moderate ranks observed for proportion of international students, outcomes, and career options; and very low ranks for resources. In short, these schools appeared to offer quality education to high numbers with comparatively less funding and resources. Constituent schools included Chuo, Kansai, and Aoyama.

Consisting of 26 institutions split into two subclusters, ***Cluster-C*** institutions or mid-tier schools similarly showed moderate overall scores based on a profile arguably distinct from the previous two clusters. High ranks were observed with career options; moderate ranks for enrolment, engagement, English instruction, and proportion of international students; and low ranks for resources and outcomes. Constituent schools included Fukuoka and Fukushima in subcluster-1, and Aizu and Kanazawa in subcluster-2.

Consisting of 25 institutions split into two subclusters, ***Cluster-D*** institutions had the lowest overall scores based on high ranks for career options; moderate ranks for enrolment, resources, English instruction, and proportion of international students; and low ranks for outcomes and engagement. Constituent schools included Gifu and Tokushima in subcluster-1, and Tokyo Medical and Kagawa in subcluster-2.

DISCUSSION

Using *Times Higher Education* 2017 rankings of Japan's institutions for higher learning, we conducted a series of verified analyses to ascertain the extent to which these data were valid and meaningful so that they might properly inform future students' choice of school. As directed by a protocol of two decades of Canadian data (cf. *Maclean's Magazine*), analysis was split into three branches: correlation analysis, means analysis, and cluster analysis. To begin, the correlation between index rank and final rank was significant for most indices (excluding each of student/faculty ratio, long-term study abroad, active learning, and career goals); this is somewhat improved from the typical statistics among Canadian data where approximately 30-40% of indices are correlated with final rank (cf. Cramer et al., 2016). It is worth noting as well that none of the correlations in the Japanese data were negative, a reassuring outcome with regard to validity and meaningfulness of these data.

Second, we compared higher- to lower-ranking schools so as to identify any rank differences in their constituent indices. Results showed that higher-ranked schools overall had higher-ranked indices for 8 (61%) of the 13 measures (excluding student/faculty ratio, enrolment, long-term study abroad, active learning, and career goals; both Resources and English instruction failed to reach significance following a correction for multiple testing). This too is somewhat improved when compared to the typical Canadian statistics of 15-25% of indices that significantly discriminated between higher- and lower-ranking schools overall (cf. Cramer et al., 2016). *Times* may wish to review their assessment of those anomalous variables which failed to discriminate higher- from lower-ranking schools, or correlate significantly with overall institutional ranks – namely student/faculty ratio, enrolment, long-term study abroad, active learning, and career goals. Arguably, several of these indices would appear relevant to students and parents, seeking a quality education from perhaps a school with lower enrolment to ensure a more favourable student/faculty ratio.

Finally, the results of the cluster analysis identified four distinct groups or clusters of varying size and composition. Cluster-A constituted the top-tier schools, typified by higher ranks both overall and among several component indices. Cluster-B schools were especially efficient as measured by good outcome measures given fewer resources. Cluster-C, the largest cluster, included mid-tier institutions with mid-level ranks both overall and among several component indices. Finally, Cluster-D included lower-tier institutions with lower-level ranks both overall and among component indices.

Our review of the data further identified several important questions worth exploring should *Times* continue its collection and distribution of Japan's institutional data. To begin, *Times* explains that the category of resources reflects whether the institution has the money to deliver effective teaching, and we observed presently that larger schools certainly have more resources; but does this necessarily translate into better teaching? This remains a tenuous assumption. Certainly, schools with more resources can afford more state-of-the-art equipment and tenured or tenure-track faculty, but a rich educational experience can be derived from a well-trained educational facilitator such as an adjunct appointment or sessional instructor (Bettinger & Long, 2010; Carrell & West, 2010; Ehrenberg & Zhang, 2005; Figlio, Schapiro, & Soter, 2013; Hoffman & Oreopoulos, 2009; June, 2012; Wiessman, 2013).

Times further delineates the implications of the student/faculty ratio, specifically as to whether the college has enough teachers. However, research on large classes has witnessed effective delivery to classrooms of hundreds or even thousands (Carpenter, 2006; Cohan, 2017); this does not include online course delivery with potentially tens of thousands enrolled. One may argue that some researchers, having been awarded sizable grants, cannot afford the extensive time needed to develop effective and engaging classroom presentations and discussions. Others may opt out or buy out of teaching using their granted funds or administrative responsibility as leverage. So too, it could be argued that graduate students – junior in their schooling in scholarship and research – may prove to be especially effective as teachers. Thus, while experts likely find a position as a researcher at top-tier universities, any replicable correlation to effective teaching remains unclear.

Times' use of the term Engagement may too be misleading, since most educational scholars would qualify this category to include active learning and experiential opportunities. Instead, this category in the Japanese data is split into both global and student skill acquisition. In short, it represents an outcome variable, hinging chiefly on the top 15 schools selected by 2400 guidance counsellors from across the country. Yet this measure invites several layers of bias, as similarly evident among Canadian evaluators. For example, the assessment of both global and student talent is derived from counsellors who themselves attended one (or perhaps two) institutions of higher learning; it is scarcely surprising they would include their own institution for self-serving motives. This same bias may have influenced employers' assessments of institutional teaching outcomes, wherein the best reputation should likely be influenced by the school where these employers attended. To what extent though would an employer, fully unfamiliar with graduates or teaching strategies utilized at Waseda or Kyoto, offer data that are both valid and meaningful?

As an overall view of the indices that *Times Higher Education* included in its assessments of Japanese institutions of higher education, we alert readers to the dissonance between what is essentially tapped by ranking engineers (some in the market to sell magazines) and that which is salient to each of students, parents, educators, administrators, and government officials (Bruneau, 2006). In one unpublished study, McLean and Cramer (2005) surveyed undergraduates as to what they believed to be the most relevant pieces of data that might inform their choice to attend a particular school. Their list was markedly different from anything published by *Maclean's Magazine,* and included such variables as graduation rate, tuition costs, and location proximity to both home and family/friends. Far less important were the number and size of medical research grants earned by faculty researchers, and the number of library holdings per student. Indeed, *Maclean's Magazine* includes a measure of library holdings (i.e., number of books per student), which may seem less relevant today given the widespread availability of online libraries one Google search away.

A deeper and possibly more sinister sociological question concerns the impact of institutional rankings on students and their families. In Canada, *Maclean's Magazine* has been unapologetic about branding lower-ranking schools with scurrilous labels such as 'last-chance university' and 'college of crayons and colouring-books.' Indeed, their magazine cover is emblazoned with the promise of learning where the 'best' students attend these particular colleges and universities. We are left to ask what impact – arguably negative – might this stigmatization have on students attending such institutions, feeling less than proud to have received their education from a school with little hope of graduating the 'leaders of tomorrow.' One must both recognize and celebrate the multiple reasons that a student selects a given institution – offering a specific program, proximity to home and family/friends, financial bursaries and support, and gainful employment; a welcoming culture, a vibrant social scene, co-op initiatives, etc.

IMPLICATIONS AND CONCLUSION

There are many important implications to be derived from the present study that deservedly warrant mention. To begin, this international comparison of Japanese to Canadian educational models helps to highlight both the advantages and disadvantages of either. For instance, although Japan utilizes stricter benchmarks concerning research and teaching, Canada's funding hinges principally on the popularity of their constituent academic programs among students. Future MEXT reports in the Japanese system would do well to survey the impressions of students and families – both before they embark on higher education and perhaps again after their first year. Finally, our 4-cluster breakdown of schools into broader categories (who share similar index ratings) should offer a useful framework by which education administrators in Japan can further delineate the quality and speciality of institutions of higher learning.

In conclusion, we observed slightly better psychometric results among recent Japanese rankings of their institutions of higher education that previously observed in Canada. *Times Higher Education* is encouraged to review the utility of their measures as made available to students and their families in an effort to better supply the information needed to make those crucial long-term commitments to higher education.

REFERENCES

Amsler, S. S., & Bolsmann, C. (2012). University ranking as social exclusion. *British Journal of Sociology of Education, 33*(2), 283-301. DOI:10.1080/01425692.2011.649835

Axelrod, P. (2010, December 6). The trouble with university rankings—*It's Maclean's Magazine time again*. Retrieved from https://www.universityaffairs.ca

Bettinger, E. P., & Long, B. T. (2010). Does cheaper mean better? The impact of using adjunct instructors on student outcomes. *Review of Economics and Statistics, 92,* 598-613.

Boyer, P. (2003). *College rankings exposed: Getting beyond the rankings myth to find your perfect college*. Lawrenceville, NJ: Peterson's.

Bruneau, W. (2006). University rankings distort higher education. *CAUT Bulletin Archives.* Retrieved from *https://bulletin-archives.caut.ca/bulletin/articles/2006/01/university-rankings-distort-higher-education*

Carpenter, J. M. (2006). Effective teaching methods for large classes. *Journal of Family and Consumer Sciences Education, 24,* 13-23.

Carrell, S. E., & West, J. E. (2010). Does professor quality matter? Evidence from random assignment of students to professors. *Journal of Political Economy, 118,* 409-432.

Chou, C. P. (2014). *The SSCI Syndrome in higher education*. Rotterdam: Sense Publishers.

Cohan, D. J. (2017). Class size matters. *Inside Higher Education.* Retrieved from https://www. insidehighered.com/advice/2017/09/19/how-teach-large-classes-students-effectively-essay

Cramer, K. M., Page, S., Burrows, V., Lamoureux, C., Mackay, S., Pedri, V., & Pschibul, R. (2016). The marketing of Canadian university rankings: A misadventure now 24 years old. *Collected Essays in Learning and Teaching, 9,* 227-235.

Eagleton, T. (2015, April 6). The slow death of the university. *The Chronicles of Higher Education*. Retrieved from http://chronicle.com/article/The-Slow-Death-of-the/228991

Ehrenberg, R. G., & Zhang, L. (2005). The changing nature of faculty employment. In R. Clark & J. Ma (Eds.), *Recruitment, retention and retirement in higher education: Building and managing the faculty of the* future (pp. 32-52). Northampton, MA: Edward Elgar.

Einot, I., & Gabriel, K. R. (1975). A study of the powers of several methods of multiple comparisons. *Journal of the American Statistical Association, 70,* 574–583.

Figlio, D. N., Schapiro, M. O., & Soter, K. B. (2013). Are tenure track professors better teachers? *Review of Economics and Statistics, 97,* 715-724.

Hazelkorn, E. (2015). *Rankings and the reshaping of higher education: The battle for world-class excellence* (2nd ed.). NY: Palgrave Macmillan.

Hoffman, F., & Oreopoulos, P. (2009). Professor qualities and student achievement. *Review of Economics and Statistics, 91,* 83-92.

June, A. W. (2012). Adjuncts build strength in numbers: The new majority generates a shift in academic culture. *The Chronicle of Higher Education, November 5, 2012.*

Ishikawa, M. (2009). University rankings, global models, and emerging hegemony: Critical analysis from Japan. *Journal of Studies in International Education, 13,* 159-173.

Ishikawa, M. (2014). Ranking Regime and the future of vernacular scholarship. *Education Policy Analysis Archives, 22,* 1-22.

Li, J. (2016). The global ranking regime and the reconfiguration of higher education: Comparative case studies on research assessment exercises in China, Hong Kong, and Japan. *Higher Education Policy, 29*, 473-493.

McLean, L., & Cramer, K. M. (2005). *Students' preferred indices for institutional selection: Where is the learner in Maclean's rankings?* Unpublished manuscript, Department of Psychology, University of Windsor, Windsor, Canada.

Post, D. (2012). Rank scholarship. *Comparative Education Review, 56,* 1-17.

Shimmi, Y., & Yonezawa, A. (2015). Japan's "Top Global University" project. *International Higher Education 81,* 27-28. DOI: https://doi.org/10.6017/ihe.2015.81.8742

Times Higher Education (2017a). *Japan University Rankings 2017.* Retrieved from https://www.timeshighereducation.com/rankings/japan-university/2017#!/page/0/length/25/sort_by/rank/sort_order/asc/cols/stats

Times Higher Education (2017b). *Japan University Rankings 2017: Methodology.* Retrieved from https://www.timeshighereducation.com/world-university-rankings/japan-university-rankings-2017-methodology

Ward, J. (1963). Hierarchical grouping to optimize an objective function. *Journal of the American Statistical Association, 58*, 236-244. DOI:10.1080/01621459.1963.10500845

Weissman, J. (2013). Are tenured professors really worse teachers? A lit review. *The Atlantic.* Retrieved from https://www.theatlantic.com/business/archive/2013/09/are-tenured-professors-really-worse-teachers-a-lit-review/279940/

Yonezawa, A. (2010). Much ado about ranking: Why can't Japanese universities internationalize? *Japan Forum, 22*, 121-137. DOI: https://doi.org/10.1080/09555803.2010.488948

Table 1

Spearman Rho Correlation Matrix with Means, Standard Deviations, Skewness, Kurtosis Statistics

INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	M	SD	Skew	Kurt
1. Ratio	------	-.75*	.06	-.01	-.06	-.18	-.10	.19	-.03	.19	.26	-.06	-.20	12.5	7.42	2.39	6.87
2. Resources		------	.07	.22	.04	.32*	.34*	-.10	.32*	-.16	-.07	.10	.38*	60.0	11.8	0.47	-0.14
3. Engagement			------	.70*	.50*	.54*	.41*	.52*	.24*	.32*	.51*	-.04	-.15	80.8	15.4	-0.45	-1.01
4. Outcomes				------	.21	.58*	.53*	.56*	.14	.12	.38*	-.03	.10	61.3	14.3	1.28	1.72
5. Environment					------	.53*	.50*	-.12	.36*	.49*	.56*	.23	-.19	59.2	13.3	0.96	0.64
6. Intnl_Students						------	.80*	.05	.30*	.17	.30*	.11	.14	4.94	5.92	5.49	40.2
7. Intnl_Staff							------	-.03	.36*	.18	.39*	.09	.12	4.10	5.06	6.29	51.3
8. Enrolment								------	.01	.11	.17	-.24*	-.37*	12.2k	11.4k	2.73	11.2
9. Abroad_Short									------	.21*	.31*	.11	-.03	3.53	2.59	1.43	2.04
10. Abroad_Long										------	.48*	.11	-.42*	1.73	4.77	6.50	47.4
11. English Instruction											------	-.01	-.26	5.46	14.4	5.66	33.5
12. Active Learning												------	-.01	31.1	18.8	1.56	3.10
13. Careers Goals													------	91.9	6.62	-5.65	43.9
14. Total	-.14	.36*	.74*	.71*	.44*	.78*	.78*	.24*	.42*	.17	.44*	-.05	.10	61.1	10.7	0.77	1.01

Note. * $p < .05$

Table 2

Mann-Whitney U (MWU) Test of Top vs. Bottom Ranked Schools by Index

	Bottom-Ranked School	Top-Ranked School			
Index	Mean (SD)	Mean (SD)	MWU	df	p
Ratio	13.36 (9.32)	11.96 (6.08)	0.66	35	.515
Resources	56.59 (10.2)	62.70 (12.4)	2.47	81	.016
Engagement	71.49 (13.6)	88.85 (12.0)	6.48	85	<.001
Outcomes	54.82 (5.93)	67.49 (17.0)	4.96	61	<.001
Environment	50.41 (8.55)	62.43 (13.4)	3.95	39	<.001
International Stud.	2.41 (1.27)	7.37 (7.46)	4.59	51	<.001
International Staff	1.99 (0.95)	6.13 (6.42)	4.50	51	<.001
Enrolment	11272 (12k)	13057 (11k)	0.78	96	.437
Abroad_Long	1.98 (6.29)	1.50 (2.78)	0.47	59	.640
Abroad_Short	2.67 (2.07)	4.41 (2.79)	3.50	87	.001
English Instruction	2.07 (2.77)	8.65 (19.4)	2.22	45	.031
Active Learning	30.39 (14.3)	31.9 (22.7)	0.39	74	.695
Career Goals	91.21 (8.49)	92.51 (4.01)	0.98	68	.333

Table 3

Cluster and Subcluster Membership

Cluster-1		Cluster-2	Cluster-3		Cluster-4	
Sub-1a	Sub-1b		Sub-3a	Sub-3b	Sub-4a	Sub-4b
Tohoku	Hiroshima	Chuo	Fukuoka	Aizu	Gifu	Tokyo Medical
Kyoto	Tsukuba	Kansai	Fukushima	Ochanomizu	Tokushima	Kagawa
Tokyo	Waseda	Aoyama	Gakushuin	Kanazawa	Tottori	
Nagoya	Hitotsubashi	Kindai	Ibaraki	Okayama	Mie	
Osaka	Keio	ICU international	Tokyo Agric	Chiba	Kochi	
Kyushu	Kobe	Sophia	Saitama	Kysushu	Oita	
Tokyo Tech		Tokyo Science	Seikei	Yamaguchi	Fukui	
Hokkaido		Meiji	Utsunomiya	Yamagata	Gunma	
		Doshisha	Shizuoka	Yokohama	Yokohama City	
		Akita International	Nagaoka	Shibaura	Tokyo Agricult.	
		Ritsumeikan		Nagasaki	Osaka City	
				Shinshu	Toyohashi	
				Tokyo Metro	Nagoya	
				Tokyo Marine	Akita	
				Niigata	Kyoto Tech	
				Kumamoto	Kagoshima	
					Hyogo	
					Ehime	
					Toyama	
					Sara	
					Iwate	
					Electro	
					Akita	

Table 4

Mean Differences by Cluster

	Cluster-A	Cluster-B	Cluster-C	Cluster-D	F*	3,df_E	p	MSE
Variable	*M* (*SD*) *n*	*M* (*SD*) *n*	*M* (*SD*) *n*	*M* (*SD*) *n*				
Overall	81.74_a (5.78) 14	63.56_b (5.01) 11	61.25_b (5.58) 26	56.43_c (4.04) 25	67.75	30.1	<.001	25.8
Resources	72.89_a (12.10) 14	45.43_b (3.80) 11	55.2_c (8.29) 26	61.67_d (7.21) 25	38.13	34.4	<.001	69.6
Engagement	98.55_{ab} (1.49) 14	95.85_{ab} (3.39) 11	81.83_c (7.39) 26	60.70_d (7.22) 25	233.7	32.3	<.001	38.4
Outcomes	92.26_a (6.56) 14	61.75_b (3.78) 11	56.92_{cd} (5.84) 26	53.63_{cd} (7.03) 25	113.0	34.1	<.001	38.0
Intnl_Stud	9.54_a (3.12) 14	5.79_{bc} (5.13) 11	4.09_{bc} (2.21) 25	1.75_{cd} (0.35) 25	15.88	27.1	<.001	8.17
Intnl_Staff	7.68_a (2.08) 14	3.44_b (2.38) 11	3.66_b (2.37) 26	2.98_b (1.63) 25	17.43	29.8	<.001	4.41
Enrolment**	$20.7k_a$ (11.3k) 14	$21.9k_a$ (11.9k) 11	$8.0k_b$ (3.8k) 26	$6.1k_b$ (1.2k) 25	14.19	25.2	<.001	49M
Abroad_ST	4.53_a (1.73) 13	3.40_a (2.95) 11	3.70_a (3.17) 25	3.23_a (1.93) 25	1.473	30.0	=.242	6.47
Abroad_LT	1.07a (0.65) 14	3.16a (5.32) 11	2.16a (7.91) 25	0.64a (0.63) 23	2.169	28.1	=.114	26.1
English	6.24_a (4.27) 12	15.48_b (28.2) 11	2.02_a (1.82) 23	1.87_a (2.39) 17	4.315	23.0	=.015	141
Active_Lrng	26.35_a (10.23) 11	31.75_a (32.8) 11	31.31_a (16.6) 25	29.89_a (13.7) 23	0.440	27.8	=.726	341
Careers	92.86_a (2.49) 14	90.74_b (2.59) 11	93.16_a (2.75) 26	93.70_a (2.98) 25	3.103	32.0	=.040	7.64

Note. Means with identical subscripts are not significantly different from each other; both Environment and Ratio were excluded so as to maximize inclusion of the maximum number of schools

* Robust Welch ANOVA to account for variance heterogeneity

** Enrolment is represented by thousands of students