

# Analysis of Student Engagement Data from U.S. News & World Report Regarding Online Graduate Engineering Programs

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Over the past decade, online education has become much more prevalent, enabling working professionals to earn advanced degrees without ever stepping foot on a traditional brick-andmortar campus. Although convenient for employers and employees, there remain a number of questions regarding effectiveness and quality of distance instruction as compared to that offered As indicated by many studies exploring student and educator in traditional classrooms. perceptions regarding distance education [1] [2] [3] [4], the potential for greater convenience, autonomy, and affordability render it ideal for many students. However, a persistent trend demonstrates that students participating in distance education have lower rates of engagement [5], and higher dropout rates [6] [7] [8] [9]. A common theme encountered in a large majority of research surveyed for this paper is the disparity of means by which effective student-student and student-instructor interaction can be facilitated in online environments. Many concerns are grounded in the belief that student-student and student-instructor interactions contribute greatly to student engagement, which has strong links to overall student success [10] [11]. These links have seen a modicum of research efforts regarding their elucidation, and even less has been done to explore these questions in engineering education. The research which has been done in this context focusses primarily on survey responses and student or faculty perspectives of distance education. This paper aims to explore the current distance education landscape within engineering, and to apply a layer of quantitative analysis regarding the effects of student engagement on success rates as measured by degree completion and other factors.

### The Developments of Distance Education in Brief

Some of the earliest roots of distance education date back to 1850s Great Britain and are based almost entirely on systems of correspondence [12]. Despite the early start, rapid adaptation and adoption did not seriously take hold in the United States until the 1970s in response to several factors: technological advances; the role of women in the workforce; increased leisure time; non-sequential learning formats; movement across educational systems; increased life expectancy; increased rates of mid-career changes; new trends in occupational licensing requirements; and economic restraints [12]. In articulating the growth of distance education, Ferguson [12] highlights the distinction between what Toffler [13] called "second wave" and "third wave" civilization. Second wave "industrial" citizens, having experienced the clashes and technological developments that came with the First and Second World Wars, were more inclined to accept factory jobs and seek less education beyond what was needed for the majority jobs of in the U.S. On the other hand, influenced by the list of societal changes noted above, "third wave" citizens began to seek additional and specialized education despite often being in the midst of careers. According to Ferguson, the hallmarks of distance education were the following (pp 265):

- 1. The separation of teacher and learner which distinguishes it from face-to-face learning;
- 2. The influence of an educational organization that distinguishes it from private study;
- 3. The use of technical media, to unite teacher and learner and carry educational content;
- 4. The use of two-way communications so students may benefit from or initiate dialogue;
- 5. The possibility of occasional meetings for both didactic and socialization purposes.

Because this set of criteria defining distance education was articulated during the very first year of commercial adoption of the Internet in mid-1989, it is understandable that criteria 3 would fail to anticipate the pervasive and radically influential capacities that the then-young internet would soon provide. Aside from that remnant of print correspondence-based distance learning, Ferguson's criteria largely hold to this day.

Very quickly after the Internet was fully commercialized and made available to the growing public awareness (generally by the mid-1990s), online degrees began to emerge and become available [14]. A significant factor which briefly slowed the growth of online degree offerings was a law contained within the Higher Education Act (HEA) of 1992. The HEA did not permit institutions distributing Title IV Federal funds to have more than 50% online student enrollment. This act was also broadly interpreted to include the more traditional mail-in correspondence-based distance education. Becoming aware of the growing need to experiment with online education's potential, the 1998 HEA created the Distance Education Demonstration Program (DEDP), which allowed qualified institutions to apply for waivers to the 50% rule. After 7 years of comparatively rapid growth in online enrollment, the 2006 Higher Education Reconciliation Act (HERA) dismantled the 50% rule. Following this, growth rates increased even more, as expected, with more for-profit institutions beginning to emerge.

As of the 2017 Babson survey of distance education [15] one out of every three college students takes at least one online course, representing a three-fold increase in the last 10 years. In fact, as the Babson report notes [15], online enrollment continues to grow each year despite an overall decline in enrollment across all categories. Despite the continuous growth of online education programs, there is still very little research regarding how effective online education is when compared with traditional classroom education [16]. Much of the concern surrounding the effectiveness of online education centers on how student-student and student-instructor interactions differ between online and traditional contexts. In nearly all research studies reviewed for this paper, student engagement was the most common theme and focus.

Some studies suggest that the link between success and engagement is very real for online versus onsite. Bettinger & Loeb [16] examined the performance of online versus onsite students at DeVry University, where the average student takes two-thirds of their courses online and onethird onsite at one of DeVry's physical campuses. They determined that students taking a course in-person earned roughly a B- grade (2.8) on average, while if the course would have been taken online, the students would have earned a C (2.4). The analysis also revealed that taking a course online reduces a student's GPA the following term by 0.15 points. The decline in GPA for the next term is even larger for courses in the same subject area or courses for which the course in question is a pre-requisite, dropping 0.42 points and 0.32 points respectively. This strongly suggests that online students are learning less or at least retaining less. The negative effects of online education impact lowering performing students the most. The work by Bettinger & Loeb may not transfer readily to online graduate engineering education. It is important to note that 80% of DeVry's students are seeking Bachelor's degrees, not Master's. Universities offering online graduate engineering programs also have minimum undergraduate GPA requirements that block admission to lowering performing students. Nonetheless, it does suggest that the onsite dynamic is fundamentally different than online. The importance of student engagement will be discussed in detail later.

#### **Distance Education within Engineering**

It was not until the HEA 50% rule was eliminated in 2006 that institutions with specialties were able to begin exploring online education. As noted by Deming, Lovenheim, and Patterson [14], "specialized online schools could not exist under the 50 percent rule" (pp. 6). This would naturally have included many engineering schools. Although elimination of the 50% rule has enabled more engineering schools to offer online courses and degrees, engineering has seen less growth than other programs such as business and English [17]. This is largely attributed to the need for in-person lab experience, the higher level of technical difficulty of many engineering courses requiring more instructional guidance, and the need for engineers to have extensive experience working in teams to prepare for professional work. These hurdles appear to be primarily faced by engineering undergraduates, as demonstrated by the comparatively large growth in master's level engineering degrees available online. Graduate level engineering often does not require as much lab work. As the editor of the Journal of Online Engineering Education noted [18], the engineering master's degree is particularly appealing to universities because: 1) many engineering master's degrees are not an accredited level of education, which means the university can save money and time without having to be vetted by ABET as they would for a fully online undergraduate program; 2) many prospective master's level students work full time and find the online program more appealing; and 3) many institutions have found graduate engineering programs to be a good source of additional revenue.

As an extension of the unfortunate reality that very little research has been conducted regarding the effectiveness of online education when compared to traditional education, it is even more true for online *engineering* education. The Journal of Online Engineering Education (JOEE) [19] is currently the only journal focused exclusively on online education for engineering. It is a young journal with its first publication launching in 2010. Similar to other non-engineering focused research regarding online education, one of its most common themes is student engagement and how student-student and student-instructor interactions are mediated and effected by the online medium.

Using the JOEE as a case study for the outlet of research in online engineering education, a significant amount of their total publications are dedicated to student engagement. To date, more than 95% of their issues either reference student engagement as a significant factor or are explicitly focused on student engagement. Although JOEE is an outlet for this type of research, very little research has yet to focus on the actual effectiveness of online engineering education. Most of the research done thus far has centered on student and faculty perspectives rather than quantitative measures of student success. Aside from student success, there are other factors that need to be explored in more detail, such as perceived and actual value of the online engineering degree. This question lies at the intersection of survey-based research on perceptions and quantitative research on the actual impact of an online degree on a student's career. If the online educational outcomes are shown to be equivalent to the traditional classroom, the degree is still problematic if employers do not higher those engineers out of suspicion regarding the quality of online engineering education. On the other hand, if employers place a false sense of trust in graduates from online programs, it will prove problematic for the company. After discussing research regarding student engagement and interactivity within the educational process, this paper will address some of the questions regarding how student success and student engagement relate to each other as well as student and industry perceptions of value regarding the online engineering degree.

#### **Research in Student Engagement and the Prominence of Interaction**

As research has continued around the best ways to help students learn online and with technology, engagement is an important factor determining the quality of students' learning experiences, how they connect to and learn from peers and instructors, and whether interactivity leads to positive learning outcomes.

Student engagement is a topic in educational research to determine effective pedagogies, identify barriers to learning, and improve relationships with instructors and fellow students. Much of the focus has been on the activities of learning and how to make them more promotive of engagement. One such widely used framework is the active-constructive-interactive framework by [20]. In this model, doing activity as opposed to learning passively is a baseline for engagement that does not require the involvement of others. Constructive learning represents further engagement as students are producing their own knowledge by building on existing information [20], and this can also be done alone as "self-construction" (p. 80). Interactive learning is grounded in dialogues which can be constructive and/or interactive. These interactions may be with experts who give feedback and guide students towards higher learning, or they may be with peers in "joint dialogues" [20, p. 82] where two or more students co-construct learning by reflecting on the other's perspective. The active-constructive-interactive taxonomy classifies pedagogies through their task features, the activities which learners do, and the cognitive processes they use. The three levels of activity describe how engaged students are with a task, depending on expectations of behavior, dialogue, and producing outputs.

Another model of student engagement was proposed by Smith and colleagues [11] called the pedagogies of engagement model. This model is based on interactions among teams or groups of students, and it describes the dynamics of performance within cooperative and problem-based learning (PBL) contexts [11]. They argue that pedagogies of engagement are facilitated by cooperative learning groups, where students are brought together formally or informally to accomplish learning tasks around a problem. Successful groups require positive interdependence when everyone needs each other's learning to succeed. This is accomplished through face-to-face promotive interaction in the classroom. Both individual and group accountability ensures everyone will contribute to group effort, and it develops teamwork skills which students need to develop. Finally, group processing allows a team to stay aware of their functioning and intentionally optimize their performance through maintaining clear expectations. Engagement according to Smith et al.'s [11] model depends on the effectiveness of teams, as students work in learning contexts that require high activity and problem-solving.

In addition to these functional definitions of engagement, an assessment instrument has also been developed in order to standardize definitions and measurement of engagement in higher education. The National Survey of Student Engagement (NSSE) was developed in 2000 to assess undergraduate student engagement [21]. It consists of four themes with indicators that define engagement: (1) academic challenge, with the indicators of higher-order learning, reflective & integrative learning, learning strategies, and quantitative reasoning; (2) learning with peers, with the indicators of collaborative learning and discussion with diverse others; (3) experiences with faculty, with the indicators of student-faculty interaction and effective teaching practices, and (4) campus environment, with the indicators of quality of interactions for engagement, encompassing not only what happens in coursework but also a student's relationships with peers, instructors, and

campus [22]. The NSSE focuses on experiences within and outside the classroom contributing to engagement, and offers evidence that engagement is associated with learning [23].

## Student Engagement and Interaction in the Context of Distance Learning

The NSSE has been used as a tool to assess engagement for a variety of demographics and learning settings [24] found higher engagement scores from distance learners in first-year and senior participants in the 2006 NSSE survey, compared to on-campus learners. Robinson and Hullinger [5] also measured online learners' engagement using the NSSE, and found that the majority of students worked collaboratively, but sometimes did not feel they worked effectively with others. Communication was fairly regular among students, and most students felt that the online course(s) enriched their work through online discussions, work knowledge and skills, and solving complex real-world problems [5]. In terms of student and university differences, Kuh [25] noted that smaller schools typically have higher engagement, but not without variation. He also found higher within-school variation in engagement than between-school [25].

From these frameworks and research, we can identify three major themes of engagement by which to examine differences between online and face-to-face instruction:

(1) Peer interactions and collaboration. These are often facilitated by online tools and distance learning, playing an important role in engagement. [26] proposed a model for assessing engagement in massive open online courses (MOOCs) based the NSSE that highlighted factors of active learning and collaborative learning, social networking, and effective teaching. Lim et al. [27] also examined engagement in MOOCs using semantic network analysis to identify topics of discussion in student feedback and class materials. Zhao and Kuh [28] explored the importance of learning communities in fostering engagement by helping students connect intellectually and socially, and found that they were associated with higher academic performance and satisfaction. Bryan et al. [29] described how technology's "transactional presence" (p. 256) affects students' perceived connections with others in the learning contexts, and found that frequency of technology use for peer communication was positively related to student engagement. In online education, meaningful dialogues and collaboration is remote and asynchronous, and therefore more effort must be made to ensure that students are receiving the same quality of interactions that they would in person by sustaining analogous social environments.

(2) *Perceptions and influence of faculty*. Instructors play an important role in promoting engagement among students. While many faculty believe that engagement is the responsibility of students, the inspiration, dedication, and interest of faculty as shown through instructor-student interactions has been cited by students as a key element of their engagement [30]. As instructors are responsible for developing pedagogies around interactive learning [20], they play a significant role in bringing students together for meaningful authentic learning tasks and valuable discussion with peers.

(3) *Context and environment.* The digital world often proves to be a source of distraction for many students; however, successful integration of technology into learning environments may be a help rather than a hindrance. Rashid and Asghar [31] suggested that technology, student engagement, and self-directed learning are interconnected factors which support learning together in online learning contexts. Despite the high self-motivation of students who are accustomed to learning through technology, the authors warn that "it is essential that carefully designed pedagogy is promoted to not only increase student engagement, but the self-direction as well" [30, p. 609]. This is enabled by teachers as facilitators of student learning, remaining fully involved through

pedagogy and feedback while allowing students the space and freedom to navigate learning using their knowledge, inquiry, and abilities [10].

## Methodology

While looking for methods to explore how to relate student engagement levels and student success, we found a surprisingly useful and informative collection of data within the U. S. News & World Report publications of college rankings [32]. Despite some criticism regarding their ranking methods, this publication has consistently been used as a reference for universities and potential students worldwide and primarily in the United States as a source for a holistic assessment of quality in higher education for decades. U.S. News provides a yearly publication of rankings for a variety of types and classifications of educational institutions. The ranking subset chosen was the "Best Online Graduate Engineering Programs." Due to its availability, extensiveness, and recognized status, it proved to be a good place to start.

In the case of distance learning, nowadays generically termed as *online programs*, U.S. News and World Report uses the following definition:

A program for which all the required coursework for program completion is able to be completed via distance education courses that incorporate internet-based learning technologies. Distance education courses are courses that deliver instruction to students who are separated from the instructor and support regular and substantive interaction between the students and the instructor synchronously or asynchronously. Note: Requirements for coming to campus for orientation, testing or academic support services do not exclude a program from being classified as an online master's in engineering degree program. [32]

In our analysis of their data, no consideration is given to type of university, e.g., public, private, land-grant, etc. The universities chosen for the data set were the 50 top-ranked institutions. Thirteen factors were selected from the available data based on the belief that each could serves as indicators for student engagement/success, or indicators of who places value in the online engineering master's programs. The factors chosen were:

- U.S. New and World Report, program Rank
- Tuition per credit hour
- Enrollment number
- Student engagement score
- Faculty credentials and training score
- Services and technology score
- Number of programs offered
- 3-year graduation rate

- Percent of employer sponsored new students
- Average class size
- Course evaluation response rate
- Number of times per week students must long into a typical course
- Number of times per month faculty evaluate student participation

## U.S. News and World Report Student Engagement Score Methodology

Although most of these factors require no explanation, it is worthwhile to discuss the factor of student engagement score in more detail. U. S. News and World Report uses a similar methodology as the National Survey of Student Engagement (NSSE). Through survey data, NSSE reports on 10 Engagement Indicators (EIs) calculated from 47 core NSSE items. The 10 EIs are

grouped within four themes: Academic Challenge, Learning with Peers, Experiences with Faculty, and Campus Environment. Per NSSE, each EI and its components were developed via a multiyear effort. Using student focus groups, cognitive interviews, and a two-year pilot program, each EI and its components were rigorously tested quantitatively and qualitatively. Table 1 provides a summary of the 10 EIs and corresponding themes.

Theme	Engagement Indicators
Academic Challenge	Higher-Order Learning
	Reflective & Integrative Learning
	Learning Strategies
	Quantitative Reasoning
Learning with Peers	Collaborative Learning
	Discussions with Diverse Others
Experiences with Faculty	Student-Faculty Interaction
	Effective Teaching Practices
Campus Environment	Quality of Interactions
-	Supportive Environment

Table 1. Engagement Indicators by Theme

The response for each component item is converted into a numerical value (e.g., Never=0, Sometimes=20, Often=40, Very often=60). We then calculate a student-level score by taking an average of the component scores. Institutional scores are then calculated as averages or weighted averages, if different class levels were present, of the student-level scores.

Demographics of the online students are also compared across institutions. In particular, average age, male-female ratio of students within programs, undergraduate GPA, and tuition funding source were examined. The demographics did not vary greatly from institution-to-institution. Average age was late twenties, male-female ratio was approximately 85-15, required GPAs above 3.4, and around 90% were consistently employer-funded.

### U.S. News and World Report Rank Calculation Methodology

According to the Methodology section published on their website [33], the Best Online Engineering Programs uses a system which divides the total rank of a university into five categories: Student Engagement, Faculty Credentials and Training, Peer Reputation, Admissions Selectivity and Student Services & Technology. Figure 1 shows the categories and their respective weights.

Each of the five categories is informed by indicators which asses the university program's performance on a particular factor. For example, the Student Engagement category, which makes up 25% of the total rank is composed of four ranking indicators, broken up as indicated in the small pie from Figure 1. Each indicator is produced through a particular scoring process, which is representative of the parameter in question. Graduation Rate, which makes up for 44% of the Student Engagement category, is calculated through the following procedure:



Figure 1, Percentage distribution of U.S. News rankings for online graduate engineering programs.

A two-year average of the percentage of students who graduated within three years of program entry. A program must have at least 10 graduates in its reporting cohort for its data to be included in the average. This weight changed from 39 percent in 2017 [33].

## Indicators of Student Success

Although 3-year graduation rate was viewed as the tangible metric for student success, other measures would ideally be considered as well. Earning an advanced degree does not necessarily equate to future success. Short-term and long-term impacts of graduate degree attainment could provide online course designers with an indication as to effectiveness of instruction. Some short-term impacts (5 years or less) might include salary increases, promotions or reassignments, intellectual property generation, or continuation on to a PhD. Long-term impacts (10 years or more) might include whether the student became part of their organization's leadership team or an entrepreneur. Student engagement was found to positively correlate to 3-year graduation rate, but the larger questions may be whether engagement is meaningful beyond program completion and whether it can be truly transformative, such as engagement-to-motivation or engagement-to-inspiration. As the additional data needed to explore such questions of long term success are still nonexistent or unavailable, this paper's current assumption is that completion rates serve as an approximate estimation of immediate student success.

## Limitations of the U.S. News and World Report

Although U. S. News & World Report provides a large data set, it proved not to be as extensive as hoped. The factors that U. S. News & World Report considers for online education rankings are different and distinct from those used for onsite rankings. Since none of the factors could be equated, a comparison between online and onsite could not be accomplished. However, it is interesting that by choosing different factors for online vs. onsite, U. S. News & World Report recognizes there is a potential difference between the two; whether that decision is based on research or university input is unclear.

There also appears to be a great deal of entanglement in the data that U. S. News & World Report publishes, and it is not entirely apparent which factors are derivatives of other factors. For instance, as indicated in Figure 1, they use "graduation rates" as 44% of their calculation for student engagement scores. This means there will be some amount of inherent correlation between student engagement score and 3-year graduation rates. Since that is a particularly important correlation, we are going to subtract approximately 44% from the strength of correlations between those two factors.

## Analysis & Results

## Factors Correlation Analysis

After collecting the associated numeric data for each of our thirteen factors from the U.S. News and World Report (originally collected during the month of November 2018, and updated in January 2019), a correlation matrix was then used to determine if any statistical association existed between the thirteen chosen factors. Since one of our factors was comprised of ordinal data (rank) we used Spearman's rho for any correlations involving rank and Pearson's r for others. Since we knew there would be significant correlations between rank and the student engagement score, faculty credentials and training, and student services and technology scores, we excluded any corresponding significant correlations because they were completely accounted for by overlap. The following statistically significant correlations were found:

- Rank & employer sponsored new students: rho = 0.431 & sig. < 0.01
- Rank & the number of times per week students must log into the LMS per week: rho = 0.529 & sig. < 0.01
- 3-year graduation rates & student engagement score: r = 0.822 & sig. < 0.01
- Number of times per week that students must log into the LMS per week & student engagement score: r = 0.403 & sig < 0.05
- Number of times per month that faculty evaluate student participation & average class size: r = 0.459 & sig. < 0.01



Ranking of Online vs Onsite Engineering Programs

Figure 2, Online vs onsite ranking comparison.

In addition to analysis of the factors discussed above, we also looked at the relationship between the ranking (as a proxy for performance) of online and onsite engineering programs. To do this, we took the top 50 online programs that we had already collected information on, and then found out what each of those institution's corresponding traditional programs were ranked (also gathered from U.S. News & World Report). Seven of the 50 institutions were eliminated from the list because their corresponding traditional program rankings were not high enough to be on the U.S. New list. Analysis shows that there is a statistically significant correlation (sig. < 0.01 and using Spearman's rho) of 0.570 ( $\rho$ ).

#### Discussion

#### Student Engagement

As expected—based on what U.S. News and World report have made public regarding how they calculate their rank and student engagement scores—there was a very strong and statistically significant correlation between student engagement scores and 3-year graduation rates. Since 44% of the student engagement score is calculated based on 3-year graduation rates, it is difficult to know how much of the correlation is artificial. Considering the substantial strength of the correlation (r = 0.822), we believe that it is safe to assume at least some of the relationship is natural and meaningful outside the overlap generated by the U.S. News scoring methods. This finding, although no revolution, does lend support to the growing body of research regarding the strong link between student engagement and success.

One of the largest indicators of student engagement is the quantity and quality of integrations taking place, between students and other students as well as between students and faculty. This is obviously a problematic reality when considering the often-isolating nature of online courses which generally suffer from a lack of quality opportunities for interactions. Based on the factors available for analysis from U.S. News, there was no direct means by which interactions could be measured. As a proxy for engagement, how often students are required to log into the learning management system (LMS) does provide at least some information about the level of expectations that a particular institution may have. This was also supported by factors regarding how often faculty are required to evaluate their students' participation. We found that there was a medium strength correlation (r = 0.403) between the number of times that students are expected to log into the LMS and the student engagement score. It appears as though this is a natural correlation because there is no mention, in U.S. News methodology literature, that this factor is considered when calculating their student engagement score. Unsurprisingly, we also found a medium strength correlation ( $\rho = 0.529$ ) between the number of time student must log into the LMS and the overall rank of that institution. This finding suggests that requiring students to use the LMS more often does lead to more engagement and success.

Additionally, we found a medium strength (r = 0.459) correlation between how often faculty are expected to evaluate student participation and average class size. This is interesting because it suggests that institutions are generally aware of the increased likelihood that students will engage less when there are more students to manage—something which, at face value, may not be as obvious for online courses, especially considering the growth of MOOCS. Classically, this is a more noticeable problem when students are in traditional classes and visible. But many online courses require students to participate in online discussion boards as a means by which interactions can be facilitated. Naturally, it would be easier to keep track of how much each student is participating with smaller classes. It is interesting to see that there are more likely to be actual policies in place addressing the assessment of student engagement as the average size of classes increases.

### Online vs Onsite Ranking Analysis

Although we did find a statistically significant (< 0.01) correlation between online and onsite ranking ( $\rho = 0.57$ ), the collection of rankings represented was more nuanced than expected. We were surprised to find that some of the country's most notable institutions (i.e. Princeton, MIT, Harvard, Yale, Stanford) were not even in the top 50 best online programs. There are a handful of potential reasons for their absence. It could be that there is a lingering stigmatism regarding online programs and their effectiveness (actual and perceived), which may discourage top institutions from venturing into the world of online programs. Staying out may enable them to reduce rank-inhibiting noise from their metrics as they (and others) try to figure out how to implement online learning effectively. Contrary to that notion are the examples of MOOCS being developed by these same institutions. In fact, instead of appearing on list of best online programs, MIT, Harvard, Stanford, and Princeton all appear on lists of bests MOOCS. This suggests that top institutions which are exploring online learning may have a tendency to focus on either MOOCS or the conversion of traditional learning platforms, such as onsite classrooms, into their closest online equivalents, which is quite different from the methods and purpose of MOOCS.

#### Conclusions

Research on the best ways to foster student engagement in online learning environments is relatively scarce. Not only are there problems with developing effective ways to encourage student engagement, but it is also proving difficult to measure and keep track of the levels of student engagement in such programs. Data from U.S. News and World Report on online programs ranking for graduate level engineering showed that there is a significant level of awareness about the importance of student engagement. It also provided preliminary evidence that some methods of encouraging engagement are helping with student success. An unexpected finding, when looking at how rankings compare between online and onsite universities, is that there may be some amount of specialization occurring regarding online learning genres. It appears as though, in the top ranked universities, they are either highly regarded in online degree programs or MOOCS, but often not both. This may be an artifact of our analysis methodology, so further investigation into this preliminary finding will need to be conducted in future research. That aside, it is clear that a central focus as online learning environments develop should be the development of effective means by which student engagement can be encouraged and measured.

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