

Inclusive Design as a Predictor of Pass/Fail Rates in Online Courses

Amanda Blakewood Pascale
University of North Florida

Suzanne Ehrlich
University of North Florida

Amanda Lovins
University of Florida

Abstract

As the prevalence of online learning continues to increase in institutions of higher education, research devoted to understanding how these classrooms can be designed to best promote student success is warranted. For this study, online course Canvas shells at one large public four-year university were examined and scored for inclusive design. Findings indicate that inclusive design in online courses was significantly related to course pass rates. Implications and recommendations for campus administrators and faculty interested in designing and implementing online classes that promote student success are discussed.

Keywords: Online learning, inclusive design, online teaching, student success

Pascale, A.B., Ehrlich, S., & Lovins, A. (2026) Inclusive design as a predictor of pass/fail rates in online courses. *Online Learning*, 30(1), pp. 1-13.
<https://doi.org.10.24059/olj.v30i1.4759>

Online instruction is increasingly prevalent in institutions of higher education (Mishra et al., 2020). The 2020 pandemic pushed universities that were in various stages of online learning programming to rapidly transition to online teaching (Barlett et al., 2021). As a result, both faculty who previously had, or had not, taught online were challenged with creating connections with their students in addition to designing and delivering course content. The continued prevalence of virtual course offerings post-pandemic suggests that online learning will remain an option for most institutions of higher education. Many contemporary online course offerings still reflect pandemic-residual course designs or are currently undergoing redesign. However, post-pandemic, more research is needed to inform redesign of online courses that are effective in promoting student success. Further research to better understand factors that affect positive student outcomes in online settings is warranted. For this study, a course equity and inclusion rubric (Ko, 2021) was utilized to examine online course Canvas shells from one large public 4-year university to determine if there was a relationship between inclusive online course designs and course pass rates. This study can help inform faculty, instructional design staff, and administrators who are involved in design and delivery of online courses that are conducive to student academic success.

Literature Review

The literature contextualizing this study is arranged into three areas, (a) studies relating to online learning and student success, (b) research on effective online pedagogies, and (c) literature relating to inclusivity in online higher education environments. Taken together, this body of work informs the present study and provides the basis for the research design and the study's implications for practice.

Online Learning and Positive Student Outcomes

It is well-established that unless students are able to successfully academically integrate into their university they are at high risk for attrition (Tinto, 1993). In their seminal book titled *How College Affects Students Volume 3: 21st Century Evidence That Higher Education Works*, Mayhew et al. (2016) declare “academic achievement [to be] the strongest within-college predictor of educational attainment,” (p. 379). Contemporary students need to be able to academically integrate across modalities, as the rise in online course offerings may necessitate enrolling in one or several online courses on the path to degree attainment (Bartlett et al., 2021). Several studies have identified factors that contribute to success in online learning (Kauffman, 2015; Greene et al., 2015; Wladis, 2017). These factors include individual learner characteristics and satisfaction (Kauffman, 2015), as well as course level variables (Greene et al., 2015; Wladis, 2017). Historically, however, online courses were notorious for having higher dropout rates, and/or higher percentages of students earning non-passing grades than traditional courses. For instance, Frankola (2001) indicated that dropout rates for online courses could be up to 20% higher than face-to-face offerings of the same course. A follow-up study by Patterson and McFadden (2009) confirmed eight years later that the online learner attrition trend had not changed. Some studies investigated factors to explain the difference in attrition patterns for face-to-face and online learnings suggesting that online student departure decisions could be predicted by certain institutional support and learning environment variables as well as learner characteristics (Lee & Choi, 2013). Further research confirmed that the online learner experience was dependent on the quality of course design (Means et al., 2014). In the spring of 2020, the

COVID-19 pandemic brought new dimensions to the online learning discussion, namely, emergency remote teaching (EMT) characterized by the necessitated and sudden switch from face-to-face to online course delivery that left little time for measured course design and quality control aspects typically present in intentional online course delivery (Hodges et al., 2020). The pandemic-caused pivot to large numbers of online learning modalities has led to an increased interest and need to examine effective online pedagogies.

Effective Online Pedagogies

Research suggests that too heavy a focus on provision of teaching materials without regard to how students receive information and stay motivated to learn, may help explain observed student retention issues in distance learning institutions (Simpson, 2013). Creating effective pedagogical spaces requires both student and instructor connection and buy-in. To better understand perceptions of helpfulness of strategies for designing online spaces that are conducive to learning for diverse students, Martin et al., (2023) created a 45-item instrument and surveyed 478 online instructors regarding their use of these strategies. They found differences among instructor group characteristics (e.g., those who taught synchronous vs. asynchronous, graduate or undergraduate, and those who had attended a teacher training vs. not) and their perception of helpfulness of strategies to create equitable and inclusive online learning environments for diverse learners. In another study of faculty adaptation and performance of various roles (e.g., course facilitator, advisor/mentor, technology expert), Martin and colleagues (2021) found that effective instructors embraced all roles, and those who worked with instructional designers and/or took a training more frequently demonstrated these competencies within the course. Studying students' perception of specific online design elements, Chen et al., (2018) found that higher student ratings of online course design efficacy correlated to higher satisfaction and perception of learning. More recent research suggests that for effective learning to occur, course designs should center relationships among instructors, students, and learning communities to underscore the importance of the learner-to-content connection (Archambault et al., 2022). Pancansky-Brock and colleagues (2020) referred to this process as the humanization of the online learning space and asserted that particularly in the wake of the pandemic-forced pivot online, humanizing virtual courses is essential to ensuring students connect and engage in their online learning. Ample research has long supported the value of community in online learning environments (e.g., Saderia et al., 2009; Sun & Chen, 2016)—an understanding predicated on the idea that learning is a social process (Csibra & Gergely, 2006). These perspectives are grounded in theoretical underpinnings posited through learning-centered approaches and constructivism, and emphasize both the instructor and learners' humanity and individuality (McCombs, 2015).

Inclusivity in Online Spaces

Fostering connection to the online learning community is critical to support students' sense of belonging (Archard, 2014), an important component of social integration that contributes to student retention (Tinto, 1993). A growing emphasis on inclusivity in higher education has garnered attention for the need to design inclusive spaces in online as well as face-to-face environments (Hockings et al., 2012). Many universities have begun adopting operating frameworks such as Universal Design for Learning (UDL), which focuses on accessibility, inclusivity, and equity to reduce barriers for all learners (Rao, 2021). UDL and inclusive design share a common goal to make online spaces accessible to diverse learners, although they differ in

that UDL focuses on design of a single product's accessibility without the need of adaptation (CAST, 2018). On the other hand, inclusive design focuses on understanding learner needs and designing spaces to best support their experience (Persson et al., 2015). Reduction of barriers for all learners and the provision of online spaces that promote belonging and inclusivity have been shown to have positive effects on important student learning outcomes such as engagement and retention (Bawa, 2016). Along this line of thinking, the purpose of this study was to investigate the relationship between a humanized course design and delivery (inclusive design), and course pass rates in online courses.

Methods

This study was designed to investigate the relationship between inclusive design (ID) and course pass rates in online courses. The setting for the study was one large public, four-year institution, in the southeastern region of the United States. This study was the initial stage of a larger project designed to better understand how to support students enrolled in online courses. The following question guided our analysis:

Is the extent to which a course is inclusively designed predictive of course pass rate in online courses, when controlling for course-level variables identified here:

- (a) percentage of students with cumulative GPAs 3.5 or higher
- (b) percentage of students previously having earned a grade of a "D" "F" or "W" in the course
- (c) whether or not faculty had completed an online teaching training
- (d) total course enrollment

Data Collection and Instrumentation

After obtaining IRB permission, the researchers solicited participation from all faculty at the institution who taught an online course during the Summer 2020 to Summer 2021 terms. The terms were intentionally selected as the University had moved all courses online to continue learning during the COVID-19 pandemic timeframe. At the time of this research, most faculty were not utilizing online course templates in their course design. Rather, they were engaging in the design of their own Canvas shells. In total, 261 Canvas course shells were shared with the research team. After removing duplicates (i.e., same faculty member who taught multiple sections of a course), remaining courses were sorted based on pass rate and grouped into three categories: (a) high pass rate, (b) medium pass rate, and (c) low pass rate. A stratified random sample was taken from these three groups resulting in a total analytic sample of 71 courses. Of these 71 courses, approximately 60% were upper-level undergraduate courses, 39% were lower-level undergraduate courses, and the remaining 1% were graduate-level courses. As the groups were only stratified by pass rate prior, course levels were randomly assigned across the three groups. Course enrollments ranged from 20 to 218. Course disciplines were diverse in nature and areas across campus including the sciences, arts, engineering, computing, mathematics, humanities, and education were represented in the analytic sample. The university enrolls approximately 16,000 students, approximately 14,000 of which are undergraduate and 2,000 are graduate students. Approximately 58% of the student body identifies as White, and 36% as first-generation college students.

A group of undergraduate and graduate students were recruited to be a part of the research team, specifically to aid in course reviews and scoring. The *Course Design Equity and Inclusion Rubric* (Ko, 2021), was utilized to aid in scoring Canvas course shells for inclusive design. The rubric consists of 5 content areas and a number of respective indicators (a) content, (8 indicators), (b) community (7), (c) instructor (7) (d) assessment (6), and (e) in-class policies, (6). For example, one rubric item under the community content area was “relation of the course to the student.” Another rubric item under the instructor content area was “teaching presence and availability.” The full instrument is accessible via Stanford University’s Teaching Commons website.

The team of student researchers participated in three, three-hour training sessions led by one of the lead researchers with expertise in training and development and Universal Design for Learning (UDL). Each course was assigned two reviewers who were not expected to need to take the course for their degree completion. Review of the courses took place over five months. The average time per course review was three hours and each reviewer was assigned between 29 and 37 courses to review. For each item within the five content areas, (as identified in Ko’s rubric), reviewers had an option to select the most appropriate response: (a) absent/needs improvement, (b) developing, (c) present, or (d) exemplary. All courses were scored and transposed into corresponding numbers ranging from zero to three. The rubric scores ranged between zero and 27 points per content area (five content areas total). Scores were calculated for each content area and summed to create an overall inclusive design (ID) composite score. In our sample, ID composite scores ranged between 45 and 115 ($m = 88.35$; $sd = 13.44$). To mitigate potential variability in the reviewer scores, the individualized scores from each of the two reviewers were averaged.

Variables

The dependent variable for the analysis was course pass rate (CPR), operationalized as the percentage of students who passed the course earning a grade of “C” or higher. Several control variables, derived from the literature on predictors of CPRs, were included in the analysis. These were (a) percentage of students with cumulative GPAs 3.5 or higher, (b) percentage of students having earned a previous grade of a “D” “F” or “W” in the course, (c) whether or not faculty had completed an online teaching training, and (d) total course enrollment. The composite ID score served as the independent variable of interest.

Analysis and Findings

Analysis began with descriptive statistics on all variables (see Table 1).

Table 1

Descriptive Statistics

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>SE_M</i>	Min	Max	Skewness	Kurtosis
Course Pass Rate	0.82	0.13	71	0.02	0.39	1.00	-0.86	0.41
Enrollment	37.92	29.69	71	3.52	20.0	218.0	3.97	18.68

Prior_DFW_Grades	0.07	0.11	71	0.01	0.00	0.65	3.18	11.69
High_GPA	0.28	0.18	71	0.02	0.00	1.00	1.76	4.16
Teacher Training	0.42	0.50	71	0.06	0.00	1.00	0.31	-1.90
Inclusive Design Score	88.35	13.44	71	1.60	45.50	115.50	-0.57	0.81

Next data were checked to ensure assumptions had been met. Normality was assessed using Q-Q scatterplots, where data points formed relatively straight lines. Additionally, data were checked that neither homoscedasticity nor multicollinearity assumptions were violated. To ascertain if inclusive design of an online course matters to course pass rates, a two-step hierarchical multiple linear regression analysis was conducted. In step 1 variables that were literature-derived predictors of student success in online courses that described the course were entered into the null model. These variables were (a) total course enrollment, (b) percentage of students who had earned GPAs of 3.5 or higher, and (c) percentage of students who had previously earned a grade of a D, F, or W and (d) instructor training prior to teaching. In step 2 ID score was added, and the models were compared and interpreted to answer our research question:

Is the extent to which a course is inclusively designed predictive of student pass rate in online courses, when controlling for course-level variables, such as

- (a) percentage of students with cumulative GPAs 3.5 or higher,
- (b) percentage of students previously having earned a grade of a D, F, or W in the course,
- (c) whether or not faculty had completed an online teaching training, and
- (d) total course enrollment.

Model Comparison and Interpretation

Comparing the F-tests of each model to each other in Step 1 and Step 2, we found both to be statistically significant at an alpha value or .05 or below. Specifically, the linear combination of factors in Step 1 yielded a significant F-test value $F(4, 66) = 5.98, p < .001, R^2 = .27$. A combination of course level variables including (a) percentage of students with cumulative GPAs 3.5 or higher, (b) percentage of students previously having earned a grade of a D, F, or W in the course, (c) whether or not faculty had completed an online teaching training, and (d) total course enrollment explains ~27% of the variance in course pass rate. In Step 2 we added our variable of interest, ID. The F-test for Step 2 was significant, $F(1, 65) = 4.01, p = .050, \Delta R^2 = .04$. Adding ID to the predictive model contributed an additional 4% in the amount of variance explained by other predictor factors in CPR. Table 2 shows model comparisons.

Table 2

Model Comparisons for Variables Predicting CPR

Model	R^2	df_{mod}	df_{res}	F	p	ΔR^2
Step 1	.27	4	66	5.98	< .001	.27

Step 2	.31	1	65	4.01	.050	.04
--------	-----	---	----	------	------	-----

Note. Each Step was compared to the previous model in the hierarchical regression analysis.

Individual interpretation of model inputs shows that three factors in the null model were not significant predictors of CPR at the .05 level. Enrollment ($B = 0.0005$, $t(65) = 1.07$, $p = .287$), teacher training ($B = 0.04$, $t(65) = 1.25$, $p = .215$), and percentage of students with cumulative GPAs 3.5 or higher ($B = 0.13$, $t(65) = 1.66$, $p = .102$.) were non-significant factors. Percentage of previous DFW students in the course significantly predicted CPR ($B = -0.42$, $t(65) = -3.23$, $p = .002$). A one-unit increase of percentage of students earning a grade of D, F, or W in the course will decrease the value of CPR by 0.42 units. The addition of ID ($B = 0.002$, $t(65) = 2.00$, $p = .050$.) in Step 2 yielded another significant predictor of CPR. On average, a one-point increase in ID score will increase the CPR by 0.002 units. Table 3 shows a summary of the hierarchical regression analysis.

Table 3

Summary of Hierarchical Regression Analysis for Variables Predicting CPR

Variable	B	SE	95% CI	β	t	p
Step 1						
(Intercept)	0.76	0.04	[0.69, 0.84]	0	19.84	< .001
Enrollment	0.0005	0.0005	[-0.0004, 0.002]	0.12	1.1	0.277
Previous DFW	-0.44	0.13	[-0.71, -0.18]	-0.37	-3.34	0.001
High GPA	0.14	0.08	[-0.02, 0.31]	0.2	1.79	0.079
Teacher Training	0.05	0.03	[-0.005, 0.11]	0.2	1.82	0.073
Step 2						
(Intercept)	0.58	0.1	[0.39, 0.78]	0	5.94	< .001
Enrollment	0.0005	0.0005	[-0.0004, 0.001]	0.11	1.07	0.287
Previous DFW	-0.42	0.13	[-0.68, -0.16]	-0.35	-3.23	0.002
High GPA	0.13	0.08	[-0.03, 0.29]	0.18	1.66	0.102

Teacher Training	0.04	0.03	[-0.02, 0.10]	0.14	1.25	0.215
ID Score	0.002	0.001	[0.0005, 0.004]	0.22	2	0.05

Discussion and Conclusions

Identifying and understanding factors that influence student success in online courses is critically important as the number of courses offered virtually continues to increase. Though the results from this study are limited by study of courses at one university and perhaps also by the timeframe in which the study was conducted, the demonstration of a positive association between inclusive design in online course offerings and course pass rates after controlling for factors known to impact course pass rates is an important contribution to the understanding of college student success in online learning environments. Our models explained ~30% of the variance in course pass rate. Two statistically significant predictors of CPR were identified, percentage of previous D, F, and W students in the course and ID score. With this information we address our research question: *Is the extent to which a course is inclusively designed predictive of course pass rates in online courses, when controlling for several course-level variables?* Based on our research, we conclude that the answer is *yes, inclusive design in online course matters*. This finding has statistical as well as practical significance, as unlike several other factors that influence course pass rates, such as the percentage of students in the class who earned prior grades of D, F, or W, this research suggests that increasing inclusive design in online courses is a feasible and controllable way to increase student pass rates. This finding is supported via previous literature regarding the importance of student sense of belonging in online classes (Archard, 2014). Further, our findings add to the growing body of literature indicating the importance of student-faculty connection and interaction in helping students create a sense of belonging and encourage student success (e.g., Guzzardo et al., 2020). Additionally, this research underscores the need to further explore and support humanization in online courses (Pakansky-Brock et al., 2020).

Results from this study confirm that the largest amount of variance in course pass rates can be explained by the percentage of students who received grades of D, F, or W in the course. This result is not surprising, however, it is plausible that creating more inclusively designed online courses may aid in reducing the percentage of repeat students in courses, which may in turn further increase student success and reduce negative outcomes (e.g., financial burden for repeat courses and increased time to degree) for students. The results of this research indicate that intentionally designing inclusive online courses is one viable strategy to increase the numbers of students receiving passing grades in their online courses.

Limitations and Delimitations

There are some limitations of the study that should be acknowledged. Notably, the dataset included only course-level variables. That is, no individual student-level variable was accounted for within the model. It is certainly plausible that inclusion of student-level data would have enhanced the explanatory power of the statistical model. Also, there are certain characteristics of the course delivery that could have explained course pass rate outside of

inclusive design. For instance, some courses in the sample were delivered in shortened six- or eight-week summer sessions as compared to full sixteen-week semesters. Furthermore, aside from inclusion of the control variable, whether the instructor attended an online course training or not, our study did not account for courses that were originally intended to be delivered online with an instructor who had extensive online teaching experience as compared to those who were required to deliver their classes online due to the pandemic. Despite these limitations, we maintain that the results of this study have important implications from which impactful recommendations are generated.

Implications and Recommendations

This study produced important findings that may be beneficial for campus administrators, faculty, and students alike. It is necessary, however, to situate the applicability of these findings within the context relative to the time that the research was conducted. Specifically, the courses examined for this study were taught in 2020 and 2021, a unique period of study, as much of online education was characterized by emergency remote teaching (ERT), as compared to standard online education. The COVID-19 pandemic drove rapid deployment of the ERT out of necessity. To that end, many online courses lacked sound design and intentional pedagogical approaches that are typically characteristic of standard online education. Our study found that inclusive design matters to course pass rate. Interpreted in light of the context, we hypothesize that the heightened duress of the pandemic served to amplify the importance of inclusive design in online course delivery. In other words, inclusive design may be most necessary in situations where learners are experiencing stress and instability. This interpretation is consistent with research that suggests that faculty empathy contributes to students' sense of belonging and overall experience, which encourages student success (Hoffman et al., 2002). Further, we conclude that while the pandemic introduced some previously never experienced stressors that may have subsided since, post-pandemic fallout may be contributing to the steady increase in mental health issues among contemporary college-going students (Dave et al., 2024). Effectively facilitating student success will continue to require a focus on the learners' experiences and backgrounds with intentional design of online spaces and humanized learning environments (Pancasky-Brock et al., 2020).

Campus administrators are likely to benefit from the findings of this study as this research suggests a specific and feasible way to improve student academic success. For many institutions of higher education (IHE), resources are limited; this may be especially true for institutions where course pass rates are particularly problematic. Based on this research, it is recommended that campus administrators invest in faculty training designed to help faculty facilitate community in their online courses. Department chairs and deans might also consider incentivizing faculty who engage in online pedagogy professional development that explores inclusive design and delivery. Communities of practice or inquiry centered around designing and implementing inclusive design in online courses may prove to be a particularly promising strategy towards improving online student success.

Faculty are also implicated through this work. Many faculty may benefit personally (e.g., improved student evaluations, increased job satisfaction) by a positive change in their course pass rates. This research suggests that even very small changes to online course delivery may positively impact course pass rate. It is recommended that instructional designers and faculty

work together to identify small changes to their courses that allow for more inclusive design and delivery. The idea that a major course overhaul is not necessary to impact student outcomes is helpful to faculty who may wish to improve their student experience, but may feel overwhelmed or time-restricted, and for those for whom full course redesign may not be an immediate option.

Finally, students are implicated through this research as these findings point to strategies for improving the overall student experience. This research emphasizes the connection between community and academic success. As retention theory suggests (Tinto, 1993) academic integration is an essential component to student retention. This research provides insight into one feasible mechanism to help improve student pass rates, which relates to both student academic integration and retention. It is recommended that to aid in college student development, that opportunities to create community through inclusive design and delivery are pervasive across campus and inclusive of online learning environments. Further, given that post-pandemic online modalities are common in many IHEs, this research contributes to the literature around the needs of the contemporary higher education student.

Future Research

Based on the findings of this research, it is recommended that future studies investigate the effectiveness of inclusive course designs in different types of institutions to determine the generalizability of these findings across course and institution types. Future studies might also focus on student experience in online classrooms, to understand if inclusive design contributes to increased levels of student self-efficacy, or classroom community, for example.

Conclusion

This study investigates how inclusive design is related to online student course pass rates. The findings indicate that inclusive design is predictive of online student pass rate after controlling for other known indicators of student academic success. This information provides a feasible strategy that can be utilized by university administrators and faculty to encourage thoughtful design of online courses that can positively elevate the online learning experience and contribute to higher levels of college student success.

Declarations

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

References

- Archambault L., Leary, H., & Rice, K. (2022) Pillars of online pedagogy: A framework for teaching in online learning environments. *Educational Psychologist*, 57(3), 178-191. <https://doi.10.1080/00461520.2022.2051513>
- Archard, S. J. (2014). Feeling connected: A sense of belonging and social presence in an online community of learners. *International Journal of Cyber Ethics in Education*, 3(2), 13-26. <https://doi.10.4018/ijcee.2014040102>
- Bartlett, M. E., Warren, C. L., & Chapman, D. D. (2021). Supporting postsecondary faculty transition to rapid online teaching and learning. *Impacting Education: Journal on Transforming Professional Practice*, 6(2), 43-47. <http://doi.10.5195/ie.2021.158>
- Bawa, P. (2016). Retention in online courses: Exploring issues and solutions—A literature review. *Sage Open*, 6(1), 21-58. CAST (2018). Universal design for learning guide- lines version 2.2 <http://udlguidelines.cast.org>
- Chen, B., Bastedo, K., & Howard, W. (2018). Exploring design elements for online stem courses: active learning, engagement & assessment design. *Online Learning*, 22(2), 59-75. <https://files.eric.ed.gov/fulltext/EJ1181419.pdf>
- Csibra, G., & Gergely, G. (2006). Social learning and social cognition: The case for pedagogy. In Y. Munakata & M. H. Johnson (Eds.), *Processes of change in brain and cognitive development* (pp. 249-274). Oxford University Press.
- Dave, S., Jaffe, M., & O'Shea, D. (2024). Navigating college campuses: the impact of stress on mental health and substance use in the post COVID-19 era. *Current Problems in Pediatric and Adolescent Health Care*, 101585.
- Frankola, K. (2001). Why online learners drop out. *Workforce*, 80(10), 53-58.
- Greene, J. A., Oswald, C. A., & Pomerantz, J. (2015). Predictors of retention and achievement in a massive open online course. *American Educational Research Journal*, 52(5), 925-955.
- Guzzardo, M. T., Khosla, N., Adams, A. L., Bussmann, J. D., Engelman, A., Ingraham, N., & Taylor, S. (2021). “The ones that care make all the difference”: Perspectives on student-faculty relationships. *Innovative Higher Education*, 46(1), 41-58. <https://doi.org/10.1007/s10755-020-09522-w>
- Hockings, C., Brett, P., & Terentjevs, M. (2012). Making a difference—inclusive learning and teaching in higher education through open educational resources. *Distance Education*, 33(2), 237–252. <https://doi.org/10.1080/01587919.2012.692066>
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020, March 27). The difference between emergency remote teaching and online teaching. *Educause Review*.

<https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>

- Hoffman, M., Richmond, J., Morrow, J., & Salomone, K. (2002). Investigating “sense of belonging” in first-year college students. *Journal of College Student Retention: Research, Theory & Practice*, 4(3), 227-256. <https://doi.org/10.2190/DRYC-CXQ9-JQ8V-HT4V>
- Kauffman, H. (2015). A review of predictive factors of student success in and satisfaction with online learning. *Research in Learning Technology*, 23. <https://doi.org/10.3402/rlt.v23.26507>
- Ko, M. (2021). *Course design equity and inclusion rubric*. Teaching Commons. <https://teachingcommons.stanford.edu/news/course-design-equity-and-inclusion-rubric>.
- Lee, Y., & Choi, J. (2013). A structural equation model of predictors of online learning retention. *The internet and higher education*, 16, 36-42. <https://doi.org/10.1016/j.iheduc.2012.01.005>
- Martin, F., Kumar, S., & She, L. (2021). Examining higher education instructor perceptions of roles and competencies in online teaching. *Online Learning*, 25(4), 267-295.
- Martin, F., Oyarzun, B., & Sadaf, A. (2023). Higher Education Instructor Perception of Helpfulness of Inclusive and Equitable Online Teaching Strategies. *Online Learning*, 27(4), 144-170. <https://doi.10.24059/olj.v25i4.2570>
- Mayhew M. J., Rockenbach A. N., Bowman N. A., Seifert T. A., Wolniak G. C., Pascarella E. T., Terenzini P. T. (2016). *How college affects students Volume 3: 21st century evidence that higher education works*. Jossey-Bass.
- McCombs, B. (2015). Learner-centered online instruction. *New Directions for Teaching and Learning*, 2015(144), 57-71. <https://doi.org/10.1002>
- Means, B., Bakia, M., & Murphy, R. (2014). *Learning online: What research tells us about whether, when and how*. Routledge.
- Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during the lockdown period of COVID-19 pandemic. *International Journal of Educational Research Open*, 1, 100-112. <https://doi.org/10.1016/j.ijedro.2020.100012>
- Pacansky-Brock, M., Smedshammer, M., & Vincent-Layton, K. (2020). Humanizing online teaching to equitize higher education. *Current Issues in Education*, 21(2 (Sp Iss)).
- Patterson, B. & McFadden, C. (2009) Attrition in online and campus degree programs *Online Journal of Distance Learning Administration*, 12(2) 24-36.
- Persson, H., Åhman, H., Yngling, A. A., & Gulliksen, J. (2015). Universal design, inclusive

- design, accessible design, design for all: different concepts—one goal? On the concept of accessibility—historical, methodological and philosophical aspects. Universal access in the information society, *14*, 505-526. <https://doi.org/10.1007/s10209-014-0358-z>
- Rao, K. (2021). Inclusive instructional design: Applying UDL to online learning. *The Journal of Applied Instructional Design*, *10*(1), 83-97.
- Sadera, W. A., Robertson, J., Song, L., & Midon, M. N. (2009). The role of community in online learning success. *Journal of Online Learning and Teaching*, *5*(2), 277-284
- Simpson, O (2013). Student retention in distance education: Are we failing our students? *Open Learning: The Journal of Open, Distance, and e-Learning*, *28*(2), 105-119. doi.org/10.1080/02680513.2013.847363
- Sun, A., & Chen, X. (2016). Online education and its effective practice: A research review. *Journal of Information Technology Education: Research*, *15*, 157-190.
- Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago: The University of Chicago Press.
- Wladis, C., Conway, K., & Hachey, A. C. (2017). Using course-level factors as predictors of online course outcomes: A multi-level analysis at a US urban community college. *Studies in Higher Education*, *42*(1), 184-200. <https://doi.org/10.1080/03075079.2015.1045478>