



Plotting Academic Innovation: A Content Analysis of Twenty Institutional Websites

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Abstract

Academic innovation is an increasingly integrated effort and focus area in higher education institutions. Academic innovation units often include multiple foci, such as teaching and learning research, faculty development programming, and entrepreneurial elements. However, there is a lack of consensus on what defines successful academic innovation or how best to contextualize innovation efforts within a particular university environment. This content analysis of 20 university academic innovation websites explored the varied approaches, programming, and communication pathways of academic innovation as revealed through publicly available website content. Findings suggest varied levels of academic innovation impact along with common tensions regarding innovation effort versus efficacy. Additionally, the analysis surfaced challenges in communicating innovation successes across internal and external audiences.

Keywords Academic innovation · Educational technology · Faculty development · Teaching and learning

Academic innovation at higher education institutions (HEIs) is quickly becoming a mainstream feature of faculty development, teaching and learning programming, and entrepreneurial ventures. Forays into innovative areas such as adaptive learning, pedagogical partnerships, technology enhancements, and multimodal learning often aspire to create successful responses to evolving learning environments (Blumenstyk & Gardner, 2019). However, there is little consensus on what constitutes academic innovation or what indicates successful academic innovation processes (Findlow, 2008; Tierney & Lanford, 2016; Whitworth, 2011). As HEIs consider what works in their own university environments, they contextualize academic innovation through various programming options and initiatives to create their own

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operational definitions of academic innovation as well as indicators of success. This presents higher education faculty and administrators with the challenge of plotting a path towards academic innovation that has little or no comparative evaluation. Additionally, underlying elements of educational technology often overlap with academic innovation efforts, further blurring the lines between teaching and learning with technology and more specific aspects of innovation (e.g., King & Boyatt, 2014). Finally, the communities of stakeholders involved with academic innovation seem inconsistent across HEI contexts even though stakeholders are often instrumental in evaluating innovation success (Whitworth, 2011). A better understanding of academic innovation across various institutions provides higher education leaders with insights on both academic innovation goals and processes.

Exploring common communication features of HEI academic innovation units, such as websites, provides an aerial view of academic innovation in multiple contexts and formats. This article reports on a content analysis of academic innovation websites undertaken to better understand the approaches, programming, and communication pathways of academic innovation. The study was designed to explore the potential commonalities, discrepancies, and challenges across 20 institutions. After a review of relevant literature, we focused the inquiry in the areas of educational technology, academic innovation evaluation, and community connectedness. The following research questions guided our approach and analysis:

1. How, if at all, is academic innovation linked to educational technology?
2. What standards of evaluation for successful academic innovation are most evident?
3. What stakeholder communities exist for implementing meaningful connections with academic innovation processes?

These research questions situate our exploration within academic innovation as a trending area of emphasis in HEIs. We explored academic innovation processes and related website communication rather than overall perceived change. These parameters served to anchor our understanding within academic innovation initiatives specifically without attempting to capture institutional change processes broadly. Though there is an appetite for finding and scaling innovations for change in higher education (Kezar, 2011), we situate this analysis within the forward-facing communication and community processes of academic innovation across a range of institutional contexts. In doing so, we aim to contribute a complementary understanding of academic innovation as a bespoke and often highly visible effort in higher education.

The following sections detail the literature base, methodological approach, analysis, and discussion of academic innovation as communicated through institutional websites. First, we explore extant literature organized by the aforementioned areas of inquiry. Second, we address content analysis methods and specific aspects of analyzing hypertext. Then, we detail our findings structured by code frequency counts to illuminate significant content types and infer relationships

across themes (Krippendorff, 2013). We apply Serdyukov's (2017) levels of innovation impact as an interpretive construct to help describe the potential degree of impact as communicated by academic innovation activity on institutional websites. Finally, we discuss ongoing challenges and tensions with academic innovation as an aspect of universities' programming and forward-facing communication.

Literature Review

Definitions of academic innovation in related literature differ widely due to varied conceptual assumptions and institutional contexts. Though many scholars and higher education professionals agree the term *innovation* is a buzzword and susceptible to disparate approaches and applications, *academic innovation* is generally viewed as a posture of responsiveness, or reflexivity, to the many changes in the higher education environment (Blumenstyk & Gardner, 2019). Related characteristics of newness, novelty, and creativity are often associated with academic innovation as a concept rather than a strictly defined approach or process (Serdyukov, 2017; Tierney & Lanford, 2016). Academic innovation processes are frequently characterized similarly to general innovation pathways for new services and workflows or implementing new ideas (Kezar, 2011; Stvilia & Gibradze, 2019). These descriptions differ from more change-oriented descriptions of innovation as a result of transformational learning or the need for institutional change (e.g., Kezar et al., 2018). Some extant research points to innovation as natural iterative processes *responding to* the evolving higher education landscape (Hoffman & Holzhuter, 2012; Tierney & Lanford, 2016). Therefore, a useful baseline definition for academic innovation is the conception and application of new or novel ideas in evolving learning environments. However, the process of how best to respond to higher education trends and the specific challenges prompting a desire for academic innovation are up for debate.

Academic Innovation and Educational Technology

Academic innovation research and popular writing often present an overlap with educational technology, digital innovations, or eLearning in general. According to Serdyukov (2017), innovation in education includes both a novel idea and a successful change resulting from the implementation of that idea. Serdyukov found innovations in education often focused on productivity and efficiency of learning, both fitting sparks for technology use. Similarly, Whitworth (2011) case study of a significant technology-based classroom innovation found that technology-based innovations are both risky and attractive in that the promise of successful change is tempered by the potential for perceived failure or embarrassment of stakeholders. In this way, educational technology as a pathway to academic innovation is hard to strategically manage (King & Boyatt, 2014). Given the tendency to view technology as a new or novel approach to an unmet need, it is natural for HEIs to favor technocentric innovations in programs and initiatives (Papert, 1987, 1988).

Several researchers address this blurred line between academic innovation and educational technology, though they differ in their assessment of specific differences between the two foci. Stvilia and Gibradze (2019) cited technology in the top 12 service categories revealed through analysis of social media communications across 36 HEI innovation centers. However, they note eight other service categories ranked ahead of technology that may or may not include technology use in implementation (e.g. community building, operations, networking). Similarly, King and Boyatt (2014) described eLearning as a HEI workplace innovation that supports teaching and learning efforts across faculty, staff, and administrative roles. Their case study revealed eLearning uptake as a phenomenon interrelated with at-large innovation efforts, such as institutional strategy or learning communities, to centrally integrate eLearning tools and resources. These institutional contextual realities become more complex when the higher education landscape is considered as part of an increasingly technological workforce and a knowledge-driven economy.

Academic innovation through educational technology is partially fueled by an increasingly diverse student body preparing for a more technology-driven economy (Dobbins, 2009). As instructors and students alike play a role in the adoption of new educational technology applications, the continuum of what counts as innovation ranges from mere adjustments in the educational process to full transformation of the educational system (Serdyukov, 2017). The higher education environment is notoriously static (Lindquist, 1974) and, until recently, inherently resistant to innovation in any sense, including technology. A fuller understanding of how, if at all, academic innovation tracks separately from educational technology is partially found in the standards of evaluation emerging from HEI innovation initiatives.

Standards of Evaluation for Academic Innovation

Success in academic innovation initiatives is not often defined clearly or closely aligned with specific desired outcomes. There is general consensus that unclear success standards are a long-standing symptom of the larger problem of HEI politics, culture, and general agency or authority of stakeholders such as faculty and administrators (Jakovljevic, 2018; Lindquist, 1974; Whitworth, 2011). However, a more targeted concept emerging from extant literature is the pathway for evaluation. Beyond exploring what success looks like in academic innovation, HEIs must answer the question of what approach to take when evaluating academic innovation efforts. It is relatively easy to deem an innovation successful based simply on participation and/or completion of a project. It is much more challenging to determine and apply standards of evaluation across multiple initiatives (Findlow, 2008). Such an effort requires attention to both contextualizing standards of evaluation and communicating successes to the appropriate stakeholders.

Academic innovation, framed as new or novel ideas in evolving learning environments, is inherently context-bound within unique institutional environments. Learning environments are multifaceted information ecologies containing unique stakeholders, institutional factors, and curricular contexts (Barger, 2016). As a result, contextualized standards of evaluation for academic innovation are shaped by the

many characteristics of HEIs such as mission, values, revenue goals, and student needs. Whitworth (2011) found conflicting assessments of innovation success or failure depending on what stakeholders were involved with generating the innovation initiative. When innovations emerge, they are likely to be “judged against criteria of success or failure which are themselves negotiated (Cervero & Wilson, 1998), a process likely to be influenced by institutional stakeholders who can bring capital to bear” (Whitworth, 2011, p. 147). This tension complicates both the process of innovative efforts and the buy-in of the internal community (Findlow, 2008). Moreover, Jakovljevic (2018) reported an important dualism in HEI innovation: stakeholder buy-in to an innovation culture at HEIs does not necessarily lead to innovation. Actualizing innovation and determining success must be both collective and individual processes with consistent and centralized indicators of success (Jakovljevic, 2018; Tierney & Lanford, 2016). However, these processes, if they exist, are inexorably linked to communication of academic innovation within the community and HEIs more broadly.

Outcomes of an academic innovation initiative are typically communicated in favorable terms to better situate innovation stakeholders as part of an HEI’s culture. Innovation communication examples focusing on stakeholders, rather than processes or outcomes, are found in pedagogical innovation (Walder, 2017), technological innovation (Whitworth, 2011), and curricular innovation (Dobbins, 2009). In each case, the presence of academic innovation initiatives are in and of themselves communicated as successful. Though communication about success standards are not ignored entirely, they are most often framed in terms of specific individuals or communities that were closely involved. An examination of the role of stakeholder communities in academic innovation reveals the significance of sponsorship and buy-in when HEIs position themselves as innovators.

Stakeholder Communities in Academic Innovation

Academic innovation in HEIs often encounters the traditional loosely coupled system found in many educational organizations (Orton & Weick, 1990; Weick, 1976). Intersecting systems of instructors, students, administrators, and staff provide both rich opportunities to innovate in multiple areas and the challenge of recruiting interest and buy-in for the academic innovation process (Serdyukov, 2017). A change or need in one group of stakeholders may trigger innovation in another. For example, Dobbins (2009) found student body diversity and the changing workforce to be important factors in engaging faculty and staff in conversations and sharing sessions around innovation. Similarly, administrators often point to innovations as a way to be nimble and responsive to change on an institutional level (Blumenstyk & Gardner, 2019). These varying perspectives result in different starting points and methods for academic innovation.

Stakeholders internal to HEI academic innovation often include students, faculty, and/or administrators, each with important perspectives and feedback pathways (Blumenstyk & Gardner, 2019). Students are primary customers of HEI academic innovation and often stand to benefit the most from successful initiatives. However,

this primacy of student experience can backfire in that students' quality of experience is affected by secondary considerations such as funding, long-term viability, and adoption rate of student-centric innovations (Findlow, 2008). Similarly, faculty members are often incorporated into academic innovation efforts to help deliver or administer pedagogical innovations or experiential learning interventions. Here, too, faculty can experience disconnects between the intended innovation and its effect on the larger learning community (Blumenstyk & Gardner, 2019). For example, Walder's (2017) grounded analysis found most instructors' perceptions of pedagogical innovations were positive, whether or not students perceived the same positive effect on learning. Administrators aiming to find broad consensus and encourage collaboration across the university must work to promote buy-in despite these potential disconnects. As noted by Tierney and Lanford (2016), stakeholders in an innovative environment must strive for open communication and transparency while responding to the entrepreneurial or market demands of the modern university.

Stakeholders external to HEI academic innovation may include other universities, donors or investors, and the general public (McClure, 2015). These groups have varying degrees of involvement in specific academic innovation initiatives while still carrying weight in terms of institutional ratings and public opinion (Tierney & Lanford, 2016). The desire of HEIs to present innovative successes and positive publicity is natural and important to most institutions' missions. However, academic innovation often operates within a teaching and learning frame, which may not attract the published assets or public attention of more entrepreneurial or trailblazing university efforts (Whitworth, 2011). For these reasons, the popular communications methods of websites, digital newsletters, and other online resources become key components of community building in academic innovation and, as such, are worthy of further investigation and analysis. The present study leveraged publicly available HEI academic innovation websites to structure a content analysis exploring links to educational technology, academic innovation success standards, and stakeholder communities.

Methods

This study examined hypertext and associated content on institutional websites to reveal the communication, approach, and programming of academic innovation. We employed content analysis methods to facilitate systematic readings of text coupled with interpretive analysis (Krippendorff, 2013). Content analysis of web-based content is increasingly used to explore readily available content via quantitative and qualitative approaches (Kim & Kuljis, 2010). Challenges inherent to analyzing web-based content include unstable or changing texts, a limited unit of analysis, and sampling of texts in multiple modalities such as images, words, and animations (Kim & Kuljis, 2010; McMillan, 2000).

To meet these challenges, we identified our sample, unit of analysis, and coding approach across several in-person research sessions to strengthen interrater reliability and shared understanding of the content. We began by identifying twenty institutional sites through Google search terms related to *academic*

innovation in HEIs. We did not limit our search to certain types of institutions (ie. private or public) or schools of a certain size that might indicate varying levels of funding. Instead, our criteria for vetting sites included a specific focus on academic or teaching and learning innovation rather than primarily entrepreneurial ventures (see Table 1). In doing so, our sampling method employed purposeful strategies with an emphasis on specific criterion anchored in a synthesis of the literature (Palinkas et al., 2015; Patton, 2002; Suri, 2011). For example, some HEIs that were identified in our initial search and seemed to fit our criteria, but upon further inspection, focused more on information technology support, rather than academic innovation. These institutions were eliminated from further analysis.

Based on Krippendorff's (2013) approach to unitizing, we determined a definable unit to be the institution's academic innovation main pages and one level, or click, down from each menu item. For example, if a main web page included a menu item about programs, we followed that item to the next level to explore the programs. This approach is consistent with recent research on click behavior and link prioritization (Song et al., 2019). We captured discrete items on each page in definable chunks such as a short paragraph, caption, or introductory sentence before an image. All data were stored, memoed, and coded in a digital qualitative web-based software that allowed for shared use and collaborative annotation.

A subset of two sites were coded and discussed to strengthen intercoder reliability through resolving differences in unitizing and coding. We leveraged a combination of a priori and open coding to organize our approach while allowing for new ideas to emerge. A priori codes aligned to the literature review themes related to educational technology, standards of evaluation, and community connections. Open coding led to multiple child codes to further indicate similarities and differences across sites. Data memoing, visible to all coders, provided an additional avenue for general observations and insights that informed the interpretive analysis detailed below.

As with all qualitative research, several analytical boundaries limited our approach. This study sought to analyze and interpret data in a specific context. Accordingly, study limitations include point-in-time data generation, a relatively small sample size, and a limited scope of units of analysis. Furthermore, during data analysis in April 2020, the team noticed a shift in content highlighted on the main page of the websites due to the response to COVID-19. There was a clear focus on educational technology, specifically how to support students and faculty in remote learning. While many of these institutions may have had the infrastructure to provide this kind of support prior to COVID-19, it may have been situated beyond our one-click level of analysis. Similarly, some schools may not have provided resources specific to remote learning in the past, but were quickly adapting. Our research does not focus on this reactive shift, but rather the calculated approach to academic innovation that was presented prior to the pandemic. Though generalization of findings to other study contexts is not our aim, we believe this study illuminates the specific context of academic innovation in selected HEIs and provides new avenues for understanding the situated realities and communication pathways for academic innovation.

Table 1 Summary of analyzed academic innovation sites

Institution	Department/Center	Web address
Arizona State University	Learning Futures Collaboratory	https://lfc.asu.edu/
Boston University	Digital Learning & Innovation	https://digital.bu.edu/
Cornell University	Center for Teaching Innovation	https://teaching.cornell.edu/
Duke University	Learning Innovation	https://learninginnovation.duke.edu/
Georgetown University	Center for New Designs in Learning & Scholarship	https://cndls.georgetown.edu/
Georgia State University	Instructional Innovation & Technology	https://innovation.gsu.edu/
Iowa State University	Center for Excellence in Learning & Teaching	https://www.celt.iastate.edu/
Lehigh University	Center for Innovation in Teaching	https://lts.lehigh.edu/center-innovation-teaching-and-learning-lehigh
University of Michigan	Center for Academic Innovation	https://ai.umich.edu/
Oregon State University	Learning Innovation Center	https://lis.oregonstate.edu/rooms/learning-innovation-center
Portland State University	Office of Academic Innovation	https://www.pdx.edu/oai/
Purdue University	Innovative Learning	https://www.purdue.edu/innovativelearning/
Saginaw State University	Center for Academic Innovation	https://www.svsu.edu/cai/projects/initiatives/
Stanford School of Education	Office of Innovation & Technology	https://gse-it.stanford.edu/
Tulane University	Innovative Learning Center	https://it.tulane.edu/innovative-learning-center
University of California Riverside	Exploration Center for Innovative Teaching & Engagement	https://ue.ucr.edu/units/xcite
University of Kansas	Center for Teaching Excellence	https://cte.ku.edu/
University System of Maryland	Center for Academic Innovation	https://www.usmd.edu/cai/about
University of Texas Austin	Faculty Innovation Center	https://facultyinnovate.utexas.edu/
University of Texas San Antonio	Academic Innovation	https://provost.utsa.edu/academicinnovation/

Findings

Through the analysis of 20 college and university academic innovation websites, we observed the broad scope of interpretation of the term *academic innovation*. Because our analysis focused on one click-level from the main webpage, there was certainly additional detail that could have been provided from further investigation. However, this methodology provided content that was most easily accessible to site visitors. We aligned the themes that emerged from this unit of analysis to the aforementioned three categories: educational technology, evaluation, and connections. These categories became our parent codes during the analysis phase, and several child codes emerged through the process as well (see Table 2).

Educational Technology

The term *academic innovation* lends itself to an obvious connection to educational technology. However, through the coding process, two types of educational technology emerged. These informed the child codes of *digital spaces* and *physical spaces*. *Educational Technology* was the third most coded (274) with the highest within *digital spaces* (177). Some HEIs invested funds to create physical spaces such as innovation centers or modern classroom settings that created flexible learning environments through the use of technology. More often, however, was the use of digital spaces for educational technology. These included online learning environments, support for learning management systems, and digital communication tools. Further analysis led to investigating where educational technology was pedagogical. We noted child codes of *teacher-centered* and *student-centered*. *Pedagogical* was the most coded (475) with

Table 2 Code frequency

Pedagogical	475
Connections	290
Ed Tech	274
Pedagogy: Teacher-centered	260
Ed Tech: digital spaces	177
Connections: online/tech	124
Standards of evaluation	105
Non-pedagogical	78
In-person connections	68
Evaluation: student learning	56
Pedagogy: student-centered	46
Images: technology interactions	42
Images: human interactions	37
Ed Tech: physical spaces	27
Evaluation: teacher effectiveness	21
Buzz words	19
Imagery	19
Evaluation: Program success	19
Images: Innovation	13

the highest frequency in *teacher-centered* (260). The majority of sites focused on technology in course design to engage students in online and physical spaces. Sites often highlighted support for faculty in learning management tools, application creation, and the use of digital tools to enhance instruction through online learning modules, in-person workshops, and financial support such as grants or other funding sources. There was a strong presence of pedagogical tools for faculty, yet little evidence of mechanisms in place to assess the tools' ability to improve instruction.

Standards of Evaluation

This content analysis included examining the degree to which programs assess and evaluate their success to improve student achievement. *Standards of evaluation* was a parent code (105) with two disparate child codes that emerged. The most common was the child code *student learning* (56) which tended to address assessment and evaluation of student learning through a variety of flexible and often adaptive technologies. The other child code that emerged, although present in fewer sites, was *program success* (19). Program success codes indicated a clear process by which they evaluated their academic innovation efforts and to what degree they were successful. Academic innovation success indicators often highlight aspects of student learning. For example, faculty support for creating student assessments (through learning management system tools) and support for student use of online tools/resources illustrated paths for academic innovation in support of student learning.

As an additional avenue to explore standards of evaluation, we took a closer look at whether or not mission statements were accessible within a one-click level on the websites. These statements often address a vision or goal to be evaluated in the future. We noted mission statements were rarely stated explicitly. There are a few examples where a mission or vision was referenced indirectly with a statement of purpose for academic innovation that included items on improving student achievement, supporting underrepresented groups, or a focus on STEM initiatives. Although mission statements were not clearly defined within our one-click level of analysis, it is evident that all sites acknowledged the importance of making connections to internal and external resources to support their endeavors.

Community Connections

Community connections were a clear thread present in all sites. The parent code of *connections* had the second-highest codes (290). The child codes that emerged were *online/technology* (124) and *in-person connections* (68). Community connections were most often leveraged through in-person programming for internal audiences through workshops to connect faculty, events for the college community-at-large, or experiential learning opportunities for students. Furthermore, academic innovation units often collaborated with other university units through hyperlinks to entities such as information technology, libraries, and other research groups. These connections provided faculty support in the form of consultations, technology support, instructional design, and student support in areas of research, writing, and the use of technology. There were few sites that made an effort to highlight global communication initiatives and tools on their introductory pages.

Finally, we observed repositories of additional resources for both faculty and students in the form of blogs, newsletters, podcasts, and publications highlighted on these sites.

In addition to the data collected through coding, some interesting memos emerged throughout the analysis. For example, the amount of personnel support dedicated to academic innovation varied greatly. We observed a variation in academic innovation staffing numbers ranging from 3–50 staff members. In some cases, there were graduate students or external contractors indicated as part of the team. The varied level of personnel investment likely influences both the communication and institutional commitment to innovation efforts. Another code that emerged, but did not lead to an overall theme, was *buzz words*. Often used yet seldom defined terminology throughout the sites indicate some aspects of varied purpose among HEI academic innovation efforts. Examples included: *Chief Innovation Officer*, *instructional innovation*, *digital scholarship*, *digital engagement collaborative*, *instructional continuity*, *digital initiatives*, *fluency*, *innovation workstream*, and *innovation collaboratory*. The variety of words indicated here showcases the highly contextualized nature of academic innovation as well as the lack of specificity of efforts and varied levels of success addressed through the websites we examined.

Levels of Innovation

This study sought to illuminate the potential programmatic and communication commonalities, discrepancies, and challenges across 20 institutions' academic innovation websites. Consistent foci such as educational technology and enhanced pedagogy cut across most institutions in our sample, yet each institution maintains unique approaches to academic innovation that stem from context-specific realities such as resources, stakeholder buy-in, and internal collaboration. A useful construct for interpreting the commonalities and differences across institutions is Serdyukov's (2017) levels of innovation impact. This spectrum indicates three levels describing the potential scope and impact of academic innovations: (1) adjustment or upgrading of the process, (2) modification of the process, or (3) transformation of the system. These levels are not evaluative in terms of success or progression. Rather, they indicate characteristics of innovation in terms of intent and degree of impact. Table 3 summarizes sample data and plots institutions' level of innovation, as determined by our synthesis of data, based on the following descriptions from Serdyukov (emphasis added):

Adjustment or upgrading of the process: innovation can occur in daily performance and be seen as a way to make our job easier, more effective, more appealing, or less stressful. This kind of innovation, however, should be considered an improvement rather than innovation because it does not produce a new method or tool.

Modification of the process: innovation that significantly alters the process, performance, or quality of an existing product ...

Transformation of the system: dramatic conversion (e.g. ... fully automated educational systems; autonomous or self-directed learning; online, networked, and mobile learning) (p. 8).

Table 3 Level of Innovation

Most frequent codes in HEI webpage	Site content highlights	Level of innovation impact
digital spaces (27) online/tech connection (18)tech interaction images (17)	Experiential,Inclusive,interactive learning, flipped classrooms, AR, VR, XR	modification
connections (15)ed tech (16) pedagogical (11)	innovation collaboratory,focus on digital fluency,digital credentialing,universal learning, personalized campus experiences for learners	modification/transformation
online/tech (13) digital spaces (11)teacher-centered (9)	support for transforming learning, tech toolssupport for staff,funding opportunities, online learning,building community	modification
teacher-centered (10)human interactions (8)in-person connection (7)	deliver course content,online learning,workshops, collaboration, inclusive classrooms, active learning	adjustment
pedagogical (68) teacher-centered (38)connections (28)	online learning tools, working remotely, training/support, inclusive pedagogy, assessment/evaluation	adjustment/modification
online/technological (8)ed tech (6) student-centered (6)	digital learners to leaders,experiential learning, innovative instruction, digital literacy initiative, cyberinfrastructure plan	modification
pedagogical (7)eval student learning (6)ed tech (5)	instructional continuity,technology assessmentresearch, partnering with EdX, technology-enhanced learning	adjustment/modification
Most frequent codes	Site content highlights	Level of innovation impact
online/technological (7) digital spaces (5) images of technology interactions (7)	digital scholarship, classroom technology support,learning space design,virtual desktops, experiential learning	modification
connections (32)ed tech (21)non-pedagogical (21) pedagogical (25)	The Hub (physical space),digital learning,video production, lab,HUB cast podcast	modification
connections (10)ed tech (10) pedagogical (11)	architects design, learning innovation center for new learning,ed tech,technology enhanced physical spaces,support for staff	modification
connections (29)ed tech (30) pedagogical (48)	significant changes create online and experiential learning opportunities	modification
pedagogical (23)ed tech (13) connections (10)	shifting to online learning opportunities-support for faculty	modification
pedagogical (35)ed tech (30) connections (27)teacher-centered (27)	supporting instruction,engaging students, global learning, accessibility,faculty support, creating content	adjustment
online/technological (8) non-pedagogical (8)digital spaces (6)	chat bots,mobile inquiry-based learning environment, app development, simulations, conversational AI	modification/transformation

Table 3 (continued)

Most frequent codes in HEI webpage	Site content highlights	Level of innovation impact
connections (19) pedagogical (19) student-centered (9)	swift transition to online learning, virtual chats, experiential learning, collaboration with the community, tutoring, research, engagement, [collaboration] facility	adjustment
ed tech (6) connections (5) digital spaces (5) teacher-centered (5)	liaisons between IT and research, new tactics for lessons, workshops, tech tools	adjustment
pedagogical (32) teacher-centered (22) ed tech (7)	making learning accessible, inclusive syllabus, using technology, online classes, professional development	adjustment
connections (5) pedagogical (5) standards of evaluation (7)	removing barriers, accessibility, affordability, quality, academic innovation to support student success, high impact practices	modification
Pedagogical (36) Ed Tech (30) digital spaces (17)	classroom technology support, digital experience lab, production services for online/hybrid courses, immersive learning	adjustment/modification
Pedagogical (109) Teacher-centered (99) Connections (46)	inclusive teaching and learning, instructional continuity, remote teaching tools, graphic syllabus, flipped classroom, democratization of the classroom, faculty innovation center	adjustment/modification

Table 3 illustrates the potential degree of innovation impact based solely on the unitized and coded data for this study. It is possible that other aspects of academic innovation are captured or communicated differently throughout institutions’ websites. As a result, Table 3 is illustrative of potential academic innovation, planning, and evaluation structures, and is not evaluative of holistic institution efforts.

Discussion

The findings and summary of innovation impact underscore two primary elements of academic innovation that warrant discussion and further exploration. First, demonstrated effort in academic innovation may or may not align with realized efficacy. Secondly, institutional websites as an aspect of academic innovation communication present opportunities for more consistent internal and forward-facing communication. Our discussion illuminates commonalities in institutional contexts and innovation processes, though our scope and analysis methods may limit the generalizability and transferability of some elements.

Effort versus Efficacy

Most HEIs in this study make efforts toward new or novel ideas but do not significantly address realized change or efficacy. This may be partly because they exist in liminal spaces between various degrees of impact as noted in Table 3. Additionally, upfront investments of time and resources do not always align with perceived success, or effectiveness, of academic innovation initiatives. Efficacy seems to be interrelated with how well stakeholders expectations are managed and how, if at all, innovation benefits are communicated to end users (often faculty). This assertion aligns with Whitworth's (2011) evaluation of grand educational technology innovations and Findlow's (2008) call for transparency and trust throughout the innovation process.

Findings of the present study suggest that transparency and alignment of goals and outcomes better situate HEIs to move towards innovations that modify and/or transform institutional systems and culture. For example, exploring how, if at all, an institution navigates using existing resources and collaborations around educational technology provides more specific connections to what change in capacity is possible through a new innovation initiative. Closer examination of what efficacy looks like and how success is evaluated should include indicators addressing consistent standards for exploring or initiating innovation opportunities *and* how best to communicate these opportunities to the larger community.

Intentional Communication

HEIs in this study all make some level of effort to communicate both their goals and current activities or initiatives via a public-facing website. Though they vary in specificity, websites tend to be an important aspect of HEI communication and engagement with internal and external stakeholders. Our findings suggest that a greater degree of intentionality regarding academic innovation purposes and processes could aid in communicating clear benefits to all stakeholders. Similar to Dobbins (2009), we suggest contextualizing potential advantages of academic innovation is helped by personalizing opportunities and motivating stakeholders to engage. Accordingly, HEI academic innovation units might recruit and maintain interest from stakeholders through more reflexive and consistent communication and messaging regarding how innovation helps or improves individual workflows.

Intentional communication could entail systematic assessment of activities, clear definitions of industry terms, and specific links between academic innovation initiatives and stated mission goals or values. For example, some of the HEIs in this study adopted innovation buzzwords without clearly defining them or providing scholarly context. Though using current terminology is a natural tendency, HEIs could benefit from clear and consistent terminology that reinforces unit goals and better translates current and potential impact in the larger field of academic innovation.

Application and Conclusion

This study examined academic innovation websites to better understand the link between innovation and educational technology, approaches to academic innovation success indicators, and relevant stakeholder communities. Academic innovation as a concentrated or distinct effort in HEIs is increasingly common as universities seek to maintain currency and effectiveness in a competitive educational space. However, the structure and communication of academic innovation units do not present a common understanding or mission for innovation in higher education broadly. Instead, most academic innovation units reviewed in this study form their own approaches for navigating new initiatives and determining success. Opportunities exist for HEIs to more clearly communicate and showcase their academic innovations as contributions to the larger higher education community. Emphasizing clear goals for academic innovation efforts, understanding intended level of innovation impact, and transparent communication of accomplishments will ultimately help institutions move towards transformative educational systems. More specific efforts in these areas can enable HEIs to systematize and standardize academic innovation within their context as well as contribute to innovative solutions in higher education broadly. This call to action for greater transparency and specific attention to innovation outcomes will strengthen institutions' program efficacy as well as their approach to online communication via websites.

This article contributes to a growing literature base on academic innovation as an integrated process and aspirational goal. Despite the natural limitations of content analysis methods for exploring point-in-time hypertext, we hope this article serves as a point of reflection as well as an insight to measuring current and potential opportunities for academic innovation impact. Many questions remain in terms of how forward-facing communication, such as websites, can both fuel and communicate academic innovation that applies new or novel ideas in evolving learning environments. This study highlighted the profound differences in HEI contexts and the forward-facing communication that signals how academic innovation is structured. Further research on individual stakeholder roles, institutional commitment and funding, and internal collaboration will help illuminate more specific pathways for plotting innovation as a distinct effort beyond technology integration or short-lived projects. Opportunities for multi-institution collaboration and sharing of information across academic innovation efforts, such as a virtual summit or special interest research group, could provide clarity and vision in the field. In doing so, HEIs can make the potentially invisible successes of academic innovation (Whitworth, 2011) a more tangible experience and realized change.

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Data Availability All data and material for this study are publically available websites and associated content as noted within the article.

Declarations

Conflicts of interests We have no conflicts of interest to disclose.

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