

Faculty Hiring at Top-Ranked Higher Education Administration Programs: An Examination Using Social Network Analysis

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Abstract Using network analysis we investigated faculty hiring at 21 U. S. News top-ranked programs in higher education administration. Our research questions were as follows. Do top programs hire from each other? Are faculty from the “outside” finding positions at top programs? Mixed results hint at implications for the “health” of the hiring network. Closed systems in higher education may produce unintended consequences as graduate programs look to expand into new global markets.

Key words faculty hiring · network analysis · graduate programs

The term *network* is common in society’s lexicon today; and it is used to describe phenomena such as terrorist organizations, complex computer systems, or loose affiliations

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of people on the Internet. The word suggests the presence of connections, relationships, and lines of communication. Barabási (2002), characterized networks as:

...open[ing] up a novel perspective on the interconnected world around us... [and they] will dominate the new century to a much greater degree than most people are yet ready to acknowledge. They will drive the fundamental questions that form our view of the world in the coming era. (p. 7)

Social networks also exist in postsecondary education, as with any human enterprise. What about among elite graduate programs? Are networks present there, and what can we learn from them?

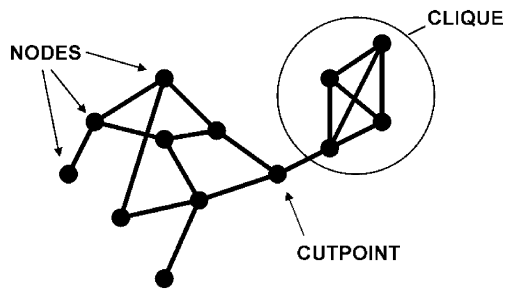
For our study we used social network analysis to investigate faculty hiring at top graduate programs in higher education administration in the United States. The idea for this study emerged from the experience of the authors when attending regional and national academic conferences during the past 5 years. For example, when graduate students and faculty members from approximately 80 preparation programs in higher education (iSeek 2007) assemble at conferences, they invariably talk with each other about informal rules and perceived norms of the national network in higher education programs, including conversation about “myths” and “legends” regarding the hiring of faculty members. Some of this discussion may appear trivial, but it actually hints at important implications for the “health” of a social system or professional network. For example, there exists a perception that top programs only hire from each other, seeking both experienced faculty and recent graduates from other top programs nearly exclusively. What about the notion that good programs do not hire from their own recent graduates? Is that true? Another commonly held belief is that programs have a propensity to hire from schools within their same collegiate athletic conference, such as Big Ten or PAC-10. Is there empirical evidence to shed light on these questions; and, if so, can social network analysis help?

Social Networks

The study of networks has become increasingly popular in the social sciences, particularly in the disciplines of sociology, political science, and anthropology (Watts 2004). Social scientists use network analysis to investigate relationships among and between cultures, institutions, and individuals. Sometimes referred to as the “new science of networks” (Watts 2003, p. 43), this scientific technique has enjoyed a postmodern renaissance of sorts due to advances in computing and communications, which can provide the powerful tools necessary for studying complex relationships. Carolan and Natriello (2005) suggested that the Internet and easy-access databases have a lot to do with the emergence of social network analysis. For example, in this study, university and department web sites were the sources for data about academic programs and faculty, which represent the basic units of social affiliation for analysis.

In its simplest form, a social network is a collection of points, typically referred to as “nodes,” and lines, representing the connections between nodes. Nodes are related to each other directly, with a straight-line connection, or indirectly, with lines passing thorough other nodes. As depicted in Fig. 1, a node is the fundamental unit of a graph. Figure 1 also shows a cutpoint, which is a node vital to the system and the removal of which would divide the graph into two or more subsystems. The clique shown in Fig. 1 represents a group of nodes more closely associated with each other rather than the rest of the graph. Characterized as a form of descriptive statistics, social network graphs provide a useful

Fig. 1 Example of a basic network graph



alternative to table data for understanding relationships, including studying hiring practices among prestigious programs in higher education administration.

Burris (2004) noted that institutional reputation in academe, in addition to being based on the scholarly work of professors and graduates, has its roots in a social network of prestige through which school, departments, and programs communicate and interact with one another. He described a “view that conceptualizes departmental prestige as primarily rooted in patterns of association and social exchange, and only secondarily in scholarly productivity” (2004, p. 242). This interaction also leads to hiring faculty members from each other. Social network analysis allows researchers to understand this hiring phenomenon better and reveals how nodes, both faculty members and academic programs, are connected.

Faculty Hiring

Literature on the issue of prestige and how it influences faculty hiring is not specific to discipline or institution (Burke 1988; Caplow and McGee, 1958; Mills 1956). Bair and Bair (1998) reported that 60% of faculty members at top-ten graduate programs in special education were graduates from one of the same top schools. Other literature suggests that elite colleges and universities tend to preserve and improve their reputations by hiring from each other (Burris 2004; Kennedy 1997). The prestige of an institution or program is influential in the faculty recruitment process (Burke 1988; Caplow and McGee 1958). Magner (1993) wrote of “a tradition among elite institutions of hiring people largely from other elite campuses” (p. 1). Although tradition may be one reason for faculty hiring, other studies indicate that prestigious institutions have more resources than other institutions (Astin 1985; Bowen & Bok 1998). Impressed with these resources, both colleges and employers favor graduates of elite institutions, even absent empirical proof of the quality of education students receive (Henson 1980). While affirmative action and equal opportunity initiatives have attempted to address hiring issues in the workplace, prestige clearly remains influential in the process (Burke 1988).

Prestigious institutions and departments preserve their elite status because of their ability to recruit faculty members from other top-ranked institutions and programs while placing their own graduates in similar types of institutions (Bair 2003; Mills 1956). Based on this principle, Mattier (1991) argued that, “relatively few institutions produce the vast majority of the supply of potential academics” (p. 32). In *Homo Academicus*, French sociologist Pierre Bourdieu (1988) suggested that ruling and intellectual classes, including university faculty, strive to reproduce themselves. If this is the case, it raises the question of what happens to faculty members who are hired outside of the “prestige network.” Specifically, what happens to graduates of prestigious institutions who accept positions outside of an elite network?

Matier (1991) referred to faculty members as an “institution’s most valuable asset” (p. 31), which has implications for the market for higher education administration programs. Moreover, the existence of a relatively small number of higher education programs in the system—approximately 80 in the United States (iSeek 2007)—has the effect of increasing competitiveness and orienting the process toward prestige. If colleges continue seeking to maintain institutional prestige and academic capital by hiring from one another and accumulating faculty as assets, what are the implications for such a system? Is the hiring pattern for higher education administration programs a closed system in the pejorative sense, including *flat world* repercussions described by Friedman (2005) as isolationism and disconnectedness? Closed systems in higher education may produce unintended consequences as graduate programs look to expand into new global markets (Kienle and Loyd 2005).

Health of a Social System

In most educational research, social systems are examined through an organizational theory perspective (Bolman and Deal 2003; Morgan 1997; Schein 2004). However, these systems can also be understood through a biological lens (Boulding 1956; von Bertalanffy 1950; 1968), and several authors have noted similarities between biological and social systems (Kauffman 1993; Lewin 1992; Wilson 1975). Morgan’s (1997) classic use of metaphor to describe human organizations as living organisms includes references to different species and ecological systems. According to Morgan (1997), “the capacity of a system to evolve depends on an ability to move to more complex forms of differentiation and integration, and greater variety in the system facilitating its ability to deal with challenges and opportunities posed by the environment” (p. 41). One interesting distinction is that biological and social systems are generally “open,” while mechanical and physical systems are normally “closed” (Morgan 1997). Although the idea of organization as organism is intended as a metaphor, the similarities between the social and biological systems are apparent. Both systems have life cycles, contain processes for adapting to environments, and possess factors that influence development and health (Morgan 1997).

In addition to theoretical approaches focusing on open versus closed systems, others have examined the health of systems (Costanza 1992; Costanza 2000; Costanza and Mageau 1999; Hudson, Dobson, & Lafferty 2006). Generally, a healthy system has the characteristics of stability, sustainability, autonomy, and resilience. In contrast, an unhealthy system is unable to sustain its structure and function, thus threatening survivability. How a system deals with both challenges and opportunities also contributes to its consideration as healthy or unhealthy (Costanza 1992). The concept of network health continues to garner attention from researchers in various disciplines (Guha et al. 2008; Smith and Christakis 2008).

The Study

Through our study we explored how faculty members in top higher education programs move through their careers, with a focus on commonly held beliefs about hiring from within or cannibalizing from competing elite institutions. Moreover, the research presented here makes an empirically-based case for whether or not faculty members from outside the top rankings are finding their way into positions at elite programs. The supposition is that sufficient outside voices, both faculty and graduates from a diverse group of programs, are necessary to keep a network healthy. With the assistance of social network software,

descriptive statistics, and inferential analysis, the answers to these sorts of questions are woven into the fabric that connects people to people and institutions to institutions.

Method

The population of interest for this study was full-time faculty members at top-ranked higher education programs according to the 2007 *U.S. News & World Report* rankings (U.S. News 2007). We identified faculty members at each of the top higher education programs by using university web sites, and we included only full-time faculty members primarily affiliated with these programs. Adjunct faculty members, professors who teach primarily in other programs, and administrators who teach part-time were excluded from the sample. We used curriculum vitae to collect the data. Table 1 lists each top program and the number of full-time faculty. A total of 200 faculty members who worked for the top programs during the 2007–2008 academic year comprised our sample.

We conducted our study by analyzing three variables: (a) current institution, (b) previous institution, and (c) institution where the doctorate was earned. The analysis produced a collection of data points and connecting lines showing relationships. By clustering nodes and connections, we produced an interesting graphical representation, a theoretical construct, for discussing the sociology of hiring among top programs. Social network analysis software allows for the quantitative analysis and graphical representation of social networks.

Table 1 Sample of Top Higher Education Programs from U.S. News & World Report rankings of America’s Best Graduate Schools (US News 2007)

School	N (faculty)
1. Pennsylvania State University (PSU)	13
2. University of Michigan (Mich)	13
3. University of California-Los Angeles (UCLA)	11
4. Michigan State University (MSU)	11
5. University of Southern California (USC)	16
6. University of Georgia (UGA)	12
7. Indiana University (IU)	12
8. Stanford University (Stanford)	12
9. Columbia University (Columbia)	6
9. Vanderbilt University (Vandy)	5
11. Harvard University (Harvard)	15
12. University of Maryland-College Park (UMD)	4
13. University of Wisconsin-Madison (Wisc)	5
14. The Ohio State University (OSU)	13
15. University of Pennsylvania (Penn)	7
15. University of Texas-Austin (TX)	11
17. University of Arizona (AZ)	6
18. Florida State University (FSU)	7
18. Iowa State University (ISU)	9
18. University of Iowa (Iowa)	7
21. New York University (NYU)	5
Total:	200

Results

We first organized data using spreadsheet software, with descriptive statistics and simple percentages used to investigate the research questions central to the study. For example, regarding the question of where faculty members came from prior to holding their current post at a top-ranked higher education administration program, nearly one-quarter (24.5%, $n=49$) came from a faculty position at another top-ranked school. Thirty percent ($n=61$) came from a faculty position at a non-ranked school, and 21% ($n=42$) came from an administration job. Approximately one-fifth (19%, $n=38$) were hired into their current position immediately after completing their doctorate. For ten persons (5%) it was unclear from where they had come prior to accepting their present position as a faculty member at a top-ranked program.

Other descriptive statistics gave clues about whether or not top programs do indeed hire from within. Nearly one-fifth (19%, $n=38$) hold a doctorate from their same school, and seven (3.5%) of this number came directly from their own institution to their current faculty position. Seventy percent ($n=141$) earned their doctorate from another *U. S. News*-ranked institution and 30% from a non-ranked school ($n=59$). Assuming 80 programs in higher education (iSeek 2007), the finding that the majority of faculty members at top-ranked programs also received their doctoral degree from other top-ranked programs was statistically significant ($\chi^2=205.8, p<.001$). Eighty-seven (43.5%) faculty members have a doctorate from an institution within the same collegiate athletic conference. An interpretation of these findings, relative to the health of the social network of higher education administration programs, is provided in the discussion section.

Total Network Graph

Using network analysis software (NetDraw 2006), Fig. 2 graphically depicts the “three-step” career path used in this study (doctoral school → previous institution → current institution) for

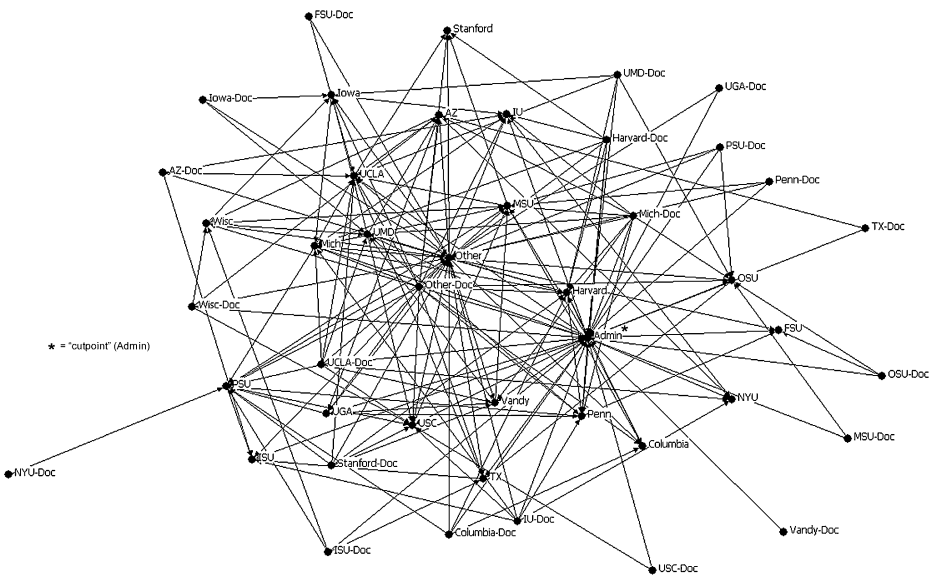


Fig. 2 Total network graph of the three-step “career paths” of 200 faculty members at US News and World Report top ranked higher education administration programs (NetDraw 2006; US News 2007)

each of the 200 faculty members. There is a total of 45 nodes in the network, which depict the 21 ranked programs for 2007; those same 21 programs from the perspective of where faculty members earned their doctorates; and three nodes representing teaching at other non-ranked graduate programs, where doctoral degrees were earned from non-ranked schools, and previous administration positions prior to present teaching assignments. As noted earlier, a node is the fundamental unit of this kind of network analysis graph.

K-core A k-core analysis is a basic technique used in social network analysis for identifying groups of nodes that are highly related and nested within portions of a network (Wasserman and Faust 1994). The computer software performs a step-by-step process where the least connected nodes are gradually removed from the graph. For example, using an algorithm provided in the network analysis software (NetDraw 2006), a subgroup of 21 nodes was assembled in which all are connected to a formulaic value of “N minus K” of each other, using six as the k-core value (K). This means that any individual node is directly connected to at least 15 others in the subgroup. In social network analysis, this type of interconnected grouping indicates a substructure, in this case a “loose or fuzzy clique,” in the total graph. An interpretation is that this group is more closely connected with one another than with the other nodes in the total graph. A group with a k-core value of one indicates a “perfect clique” in which all nodes are directly connected to each other. Figure 3 shows the graph and lists the nodes in this subgroup.

While lowering the value of K did produce even more closely connected groups and tighter cliques, the number of nodes decreased to the point where individual faculty members from the sample might be able to be too easily identified, thus violating our self-imposed anonymity criterion. A more detailed interpretation of the k-core analysis is presented in the next section.

Cutpoint As described previously, a cutpoint in a network graph represents a key node the removal of which from the system would divide the graph into two or more subsystems.

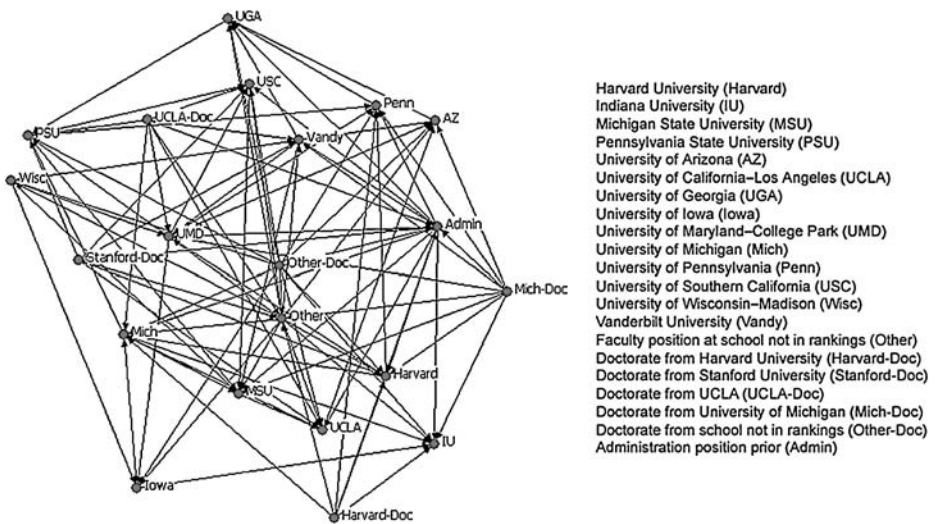


Fig. 3 Example of a clique, using social network analysis software and a k-core value of six (NetDraw 2006)

The node “Admin” (Administration position prior) emerged as a cutpoint in the network, and its position is noted in Fig. 2. Identification as a cutpoint indicates that the total graph would become significantly disconnected if this key node were removed. For example, whole sections of the network would be cutoff from the rest without the presence of the Admin node in the graph. We provide an interpretation of the presence of Admin as a cutpoint and what that implies for the hiring network in the next section.

Busy Nodes One measure of the importance of a node in the network graph is determined by “busyness,” which is how many times the node is referenced in the data set. The busiest nodes, representing higher education programs, were Harvard University ($n_{\text{Busy}}=19$) and University of Southern California ($n_{\text{Busy}}=18$). Three others (Pennsylvania State University, the University of Michigan, and the University of California at Los Angeles) were tied with $n_{\text{Busy}}=17$. However, these are also the programs with the highest number of faculty members currently. For example, in Table I, Harvard has 15 faculty members, excluding adjunct faculty and administrators who teach part time, and it is overrepresented in the sample when determining busiest nodes. Regression analysis was performed to account for the number of faculty members in each program relative to busyness.

Regression analysis indicated a statistically significant relation between “Busyness-score” and number of faculty members, $F(1, 19)=94.31, p<.001$ with $R^2=.83$. The adjusted R^2 of .82 signifies that 82% of the variability of Busyness-score is predicted by number of faculty members. Using the standardized residuals, also known as Pearson residuals, which have a mean of 0 and a standard deviation of 1 (Meyers, Gamst, and Guarino 2005), only the node UCLA demonstrated a statistically significantly higher actual Busyness-score (17) than predicted score (13.27), standardized residual=2.10. Similar regression analysis performed on the variable “Doc” (where doctoral degree was earned) failed to detect a statistically significant relationship. Adding Busyness-score and Doc produced a combined busyness score for each program and indicated a statistically significant relation ($F(1, 19)=18.72, p<.001, R^2=.49$) with the number of faculty members. The adjusted R^2 of .47 signifies that 47% of the variability of the combined busyness score is predicted by number of faculty members. However, using standardized residuals, no institutions demonstrated statistically significant differences between actual scores and predicted scores for combined busyness.

Discussion

Since interpretation of network graphs and social systems is largely subjective, a conceptual framework to identify a “healthy vs. unhealthy” system was used to analyze results and is shown in Table II. Six items from the findings, which are listed in Table II, supply evidence for the discussion of system health. The first check of the health of a social system is an interpretation of the shape of the network graph (Carolan and Natriello 2005). Some graphs are uneven or unbalanced, showing clear evidence of distinctive subgroups, noticeable clusters, and obvious cliques (Scott 2000). None of those characteristics are present in the total network graph of hiring in higher education programs presented here. While clearly a subjective interpretation and perhaps the weakest of evidence presented in Table II, the network graph depicted in Fig. 2 appears balanced and healthy, without obvious clustering of nodes.

The most convincing evidence that a closed or unhealthy social network exists in faculty hiring at elite higher education administration programs is the finding that 70% of faculty working at top-ranked programs earned their doctorates from the same top programs. This large and statistically

Table II Summary Table of Evidence for “Health” of the Social Network for Hiring in Top-Ranked Higher Educational Administration Programs

Evidence from the data regarding social network	Interpretation
1. Shape of total network graph (Fig. 1) is relatively balanced and even, without obvious close groupings or substructures.	“Healthy”
2. Seventy percent (70%) of faculty members at top-ranked higher education programs received their doctorate from another top-ranked school. Higher than previous study (Bair and Bair 1998)	“Unhealthy”
3. Faculty members at top-ranked programs came from sources represented roughly equally in percentages (24.5% from another top-ranked program, 29% from a non-ranked school, and 21.5% from administration position).	“Healthy”
4. Presence of “Administration position prior” (Admin) as a “cutpoint” in the total network graph.	“Healthy”
5. Existence of a k-core “clique” comprised of the very top programs (Fig. 2) shows closer connection among these versus others.	“Unhealthy”
6. Presence of “Faculty position at school not in rankings”, (Other) Doctorate from school not in rankings (Other-Doc), and “Administration position prior” (Admin) in the k-core “clique” depicted in Fig. 2.	“Healthy”

significantly percentage raises the issue of whether sufficient voices representing the higher education enterprise as a whole are part of these programs, with implications for the training and preparation of professionals in a diverse system of postsecondary education. However, additional findings shown in Table II provide evidence to the contrary.

For example, as indicated in Table II, faculty members came from a balanced blend of institutions and experiences prior to their current position at a top-ranked program. Although one-quarter came from another top-ranked program, half served at either a non-ranked school or in an administration position. Moreover, the presence of the “Admin” node, an administration job prior to current faculty position, as a cutpoint in the network graph suggests that the pathway to teaching at a top-ranked institution is not simply only an interchange between the same top schools. Presumably, having administration experience well represented in the network bodes well for faculty members who teach about college leadership and the students who learn from them.

The presence of a clique of the most elite of the top programs is not surprising, especially when considering literature on the subject, but it does suggest an unhealthy system. The graph of the clique depicted in Fig. 3 provides strong visual evidence to answer one of the basic research questions in the study: “Do top programs hire from each other?” Clearly they do; and, coupled with the fact that 70% have a doctorate from a top-ranked program, this raises the question central to a healthy social system. Where are the fresh perspectives and the diversity of ideas? However, closer inspection of the clique revealed that faculty members from other programs, including those who earned their doctorates from non-ranked schools and those from administrative positions, were also part of the subgroup. This indicates that some outside voices are indeed represented in the clique.

Conclusion

The 2007 global rankings for universities lists 12 U.S. schools in the top 20, signaling that graduate education in America is among the finest in the world (Ince 2007). Several of the top schools offer professional programs in higher education administration. While results

were mixed, this study provides empirical evidence that the faculty hiring network in higher education programs is generally healthy. This is important as these programs continue to move through an era of increased accountability, pursue new educational markets, and face globalization. Closed systems are not well suited to confront these challenges because of their inability to adapt to difficult situations and incorporate new ideas. However, more evidence is needed to support the notion that a broader array of programs is an indicator of health.

Further research on this topic should include qualitative methods to investigate the findings, such as examining why a majority of top-ranked programs preferred hiring faculty who have doctorates from other top programs. Moreover, in-depth interviews with department heads or deans to explore the phenomenon of a clique of the most elite programs would provide a useful follow up to this study. Continuing research on this topic should also include examining the effect of closed systems on graduate student preparation and implications for global higher education. Moreover, the social network analysis method presented here can be used for any academic discipline to check for unhealthy systems which are closed or overly prestige-conscious.

This study also introduces a novel technique for research in higher education: social network analysis. Advances in computing and communications are shaping the way humans make meaning of the world. This includes a shift in the epistemology of scientific inquiry, most notably in the social sciences where technology is influencing the ways of knowing and explaining complex human activity. Powerful computers, software products, and the Internet are the tools of an emerging “electronic epistemology,” or, as Scriven (2003) noted, “the computerization of the theory of knowledge” (p. 5).

For example, analysis tools used for data mining uncover complex relationships among many variables using millions of data points. No hypotheses are tested in the traditional sense when the “mining” is performed, as the computer seeks to ascertain relatedness in the data. Web crawlers and data engines scour a limitless labyrinth with billions of information sources that comprise the Internet, returning with hypertext data results for use in human inquiry. These technologies along with innovations in computer modeling, graphics, and social network analysis all contribute to a neo-modern twist to traditional notions of educational research. Understanding connections between and among students, faculty, and institutions, whether physical or electronic, is part of the future of investigation and analysis.

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