Examining the diffusion of research-based instructional strategies using social network analysis: A case study of SCALE-UP

Mr. Xaver Neumeyer, Western Michigan University

Xaver Neumeyer is currently a research associate at Western Michigan University, working on diffusion mechanisms of research-based instructional strategies. In his dissertation work, he examined the effect of team conflicts on students' perceptions of effective teamwork. He received his Master of Science from the Illinois Institute of Technology. He has worked on research projects related to team learning, the role of team conflict in design and decision making, and entrepreneurial thinking in student teams.

Ms. Kathleen Teressa Foote, North Carolina State University

Kathleen Foote received her B.S. degree (2010) from Providence College as a double major in Applied Physics and Physics Secondary Education and a M.S. (2013) from North Carolina State University. She is currently a doctoral student at North Carolina State University with research interests in active learning environments, the spread of research-based reform and promoting the participation of underrepresented groups in STEM fields.

Dr. Robert J. Beichner, North Carolina State University
Melissa H Dancy, University of Colorado - Boulder

Dr. Melissa Dancy is a member of the Physics Education Research Group at the University of Colorado. Her research focus is on educational transformation of STEM in higher education.

Dr. Charles Henderson, Western Michigan University

Charles Henderson, PhD, is an Associate Professor at Western Michigan University (WMU), with a joint appointment between the Physics Department and the WMU Mallinson Institute for Science Education. Much of his research activity is focused on understanding and improving the slow incorporation of research-based instructional reforms into college-level STEM courses (see http://homepages.wmich.edu/˜chenders/ for details). In spring 2010, he was a Fulbright Scholar with the Finnish Institute for Educational Research at the University of Jyväskylä, Finland. Dr. Henderson was a member of the National Research Council Committee on Undergraduate Physics Education Research and Implementation and is the senior editor for the journal Physical Review Special Topics - Physics Education Research.

Examining the diffusion of research-based instructional strategies using social network analysis: A case-study of SCALE-UP

Authors: Xaver Neumeyer[1], Kathleen Foote[2], Robert Beichner[2], Melissa Dancy[3], and Charles Henderson[1]

[1]Western Michigan University, [2]North Carolina State University, [3]University of Colorado Boulder

Abstract

Our study investigates how research-based instructional strategies spread among departments, using the example of Student-Centered Active Learning Environment for Undergraduate Programs (SCALE-UP). We are interested in how instructors learn about and implement SCALE-UP in different academic disciplines. Based on a web-based survey of 564 college and university faculty we use social network analysis (SNA) to quantify and map the interactions of instructors, departments and institutions as they share information about the SCALE-UP instructional strategy. SNA allows us to examine the underlying structure of the SCALE-UP network as well as single out influential actors. We used a set of nonparametric multiple regression techniques to evaluate the influence of actors' attributes on their role in the SCALE-UP network, and any structural features between actors that could predict their interactions. Results indicate that the majority of participants learned about SCALE-UP through the attendance of workshops or talks and personal interactions with colleagues, followed by reading literature or the Internet and using the SCALE-UP website. The SCALE-UP network contains few very influential nodes, with many outgoing ties. Similarities in gender and academic rank did not lead to an increase in interactions about SCALE-UP. In contrast, we found that institutional and departmental proximity between instructors increased the rate of interaction about SCALE-UP. Personal attributes such as gender, teaching experience, SCALE-UP user status and disciplinary affiliation showed no effect on instructors' role or status in the network.

Introduction and Literature review

There has been significant criticism of college-level teaching, particularly in the science, technology, engineering, and mathematics (STEM) disciplines (REFS). Much time, money and effort has been put into documenting the effectiveness of innovative teaching methods and curriculum and in disseminating these results. Available evidence indicates that while these efforts have had some influence on mainstream teaching, the majority of teaching is still inconsistent with what research has shown to be best practices [1–4]. Without a better understanding of how instructors use research-based pedagogies, the value of the products of educational research is greatly diminished.

Surprisingly little research has examined why research-based pedagogies integrate slowly into mainstream teaching. Pedagogies are typically developed and publicized along with data showing effectiveness with the implicit assumption that knowledge about the pedagogy and its effectiveness will be enough to motivate faculty to integrate ideas effectively in their own teaching. However, the slow progress makes it is clear that a more robust research-based understanding of change are necessary [5–7].

In addition to there being little empirical support for the "show them and they will adopt" model of reform and a lack of a more effective model in general, there is a near dearth of understanding of secondary implementations. Research-based instructional strategies are often developed in one setting by a few individuals and then disseminated for incorporation in many different settings. The uniqueness of students, instructors and structures at each location make secondary implementations non-trivial.

Secondary implementations typically lack many of the components that contributed to success at the development site such as grant funding, faculty release time, a project team and availability of education research experts. Because of the challenges of secondary implementations, innovations do not transfer easily to other environments [8–12]. For example, a ten-year study of the secondary implementation of the instructional strategy of Interactive Lecture Demonstrations found that student learning gains were "nowhere near" those claimed by the developers [12]. Despite their challenges, secondary implementations are the most common type of implementation and understanding how to support them is essential. Unfortunately, secondary implementations are rarely if ever studied in depth. What little work that has been done on the spread of innovative college-level teaching methods has typically been done in situations in which the developer is directly involved (e.g., [11,13]. For example, a developer has a grant to spread their innovation to other sites and provides funding and other forms of support for implementation at these additional sites. We know that extensive modifications are often made during secondary implementations and that these modifications are likely to result in less effective outcomes [1,3,14,15].

Therefore, our study examines the spread of the Student-Centered Active Learning Environment for Undergraduate Programs (SCALE-UP) pedagogy from a social network perspective. Social network analysis (SNA) examines the relations between people, organizations, and both groups together in different contexts; from the spread of diseases to social movements by creating visual representations of diffusion and quantifying the relations between nodes of interest [16–22]. SNA has been shown to be a powerful tool to model behaviors of individuals and groups. However, only a few studies in education have examined educator networks using SNA [23,24]. In our study, we will examine the spread of SCALE-UP between instructors as well as the structural properties of the SCALE-UP network.

SCALE-UP was chosen because it has been shown to be effective in a variety of contexts, has spread informally from one adopter to another, and has crossed into multiple

disciplines at a variety of institutions [25,26]. SCALE-UP is a studio-based learning environment developed for introductory physics at North Carolina State University by Robert Beichner. A redesigned classroom is accompanied by a redesigned pedagogy to encourage social interactions among students and teachers, the integration of lab and lecture, and a focus on the development of conceptual understanding and thinking skills. Beichner designed SCALE-UP based on research from many sources, especially those related to the efficacy of active, collaborative, social learning [27–29].

The results of our study will add to the knowledge base of how effective happens as part of an ongoing effort to build a successful change strategy model. In this paper we will examine the following research questions:

1. What are the main avenues of SCALE-UP spread?
2. What are the main characteristics of the SCALE-UP network?
3. Do respondents' attributes correlate with their position in the network?
4. Do respondents' shared relationships affect the likelihood of their interactions?

Participants and data collection

To better understand how the SCALE-UP pedagogy has spread among college instructors in the US. Data was collected via a web-based survey. We sent surveys to people who requested access to the password-protected resources of the SCALE-UP website and database (http://scaleup.ncsu.edu/) that offers current, past or potential users a collection of resources about implementing SCALE-UP style instruction. Snowball sampling was also used to identify additional survey recipients. The survey incorporated multiple parts ranging from demographic information to the actual classroom setup. In order to build a visualization of the SCALE-UP network, we asked respondents how they received and shared information about SCALE-UP and through what medium (e.g., an internet search, workshop, talk, reading a book, etc.) (see Table 1). Two separate questions - *How did you hear about SCALE-UP style instruction* and *How did you learn about SCALE-UP style instruction?* – were combined and respondents could select multiple options for each question. Therefore, the results were analyzed based on the number of respondents (adding up to more than 100%) as well as the total number of responses (adding up to 100%). Their survey responses helped us determine whether they are adopters, past adopters, or considerers and to ask them about their contacts.

Table 1 Survey questions used to measure the spread of SCALE-UP

Questions	Response choices	
How did you hear and learn about SCALE-UP style instruction?	Formal talk/workshop (where and by whom)	Colleague in my department (name)
	Reading (list book or article)	Colleague in my field but not my institution (name, institution)
	Website	Colleague in my institution but

	(describe)	not my department (name)
	My department was using it when I was in graduate school	Another department at my institution was using it when I arrived
	My department was using it when I arrived	Other (please specify)
	Other person (explain)	Don't know
Have you helped influence anyone, even in a minor way, to implement SCALE-UP style instruction?	People in your department (name)	People in your discipline at other institutions (Name, organization)
	People at other institutions (Name, organization, discipline)	

Approximately 1300 surveys were sent out in rounds between December 2012 and August 2013. Three reminders were sent to non-respondents and people could elect to be removed from the list if they thought the survey was irrelevant. In total, we collected 812 surveys, of which 564 (2- and 4-year colleges and institutions in the US) are used in the analysis presented in this paper. Consequently, the social network was built by making connections between people named in the survey questions.

Methods of Analysis

The resulting social network was then analyzed to better understand how respondents' attributes (e.g. gender, departmental and institutional affiliation, teaching experience, and self-described user status) and commonalities (e.g. gender, departmental and institutional affiliation, and rank) influence their interactions, position and status in the SCALE-UP network. Three different network measures were included in the analysis: (1) ***degree centrality***, (2) ***betweenness centrality***, and (3) ***k-step reachability***.

Degree centrality is defined as the number of ties that an actor maintains with other actors of the network. Ties between actors can be directed or undirected. In principle, the SCALE-UP network is directed, as respondents have either influenced (outgoing tie) others or have been influenced by others (receiving tie). Therefore, degree centrality will be further separated into indegree (incoming ties) and outdegree (outgoing ties) centrality. An instructor with a high outdegree centrality will have influenced many other instructors, whereas an instructor with a high indegree centrality has been influenced by many other instructors.

Betweenness centrality quantifies the number of times a node acts as a bridge along the shortest path between two other nodes. For example, an instructor with a high level of betweenness centrality might control the flow of information about SCALE-UP or act as intermediary between interested parties of SCALE-UP.

Lastly, k-***step reach centrality*** measures how many nodes a given node can reach in k or fewer steps. Since, we have a directed network, two measures are used: 'in' k-reach centrality and 'out' k-reach centrality. 'Out' k-reach centrality is defined as the proportion of actors that a given actor can reach in k steps or less, whereas 'in' k-reach centrality is the proportion of actors that can reach a given actor in k-steps or less.

In contrast to traditional statistical techniques such as the *T-Test* or *ANOVA* that describe distributions of attributes of actors, statistical techniques developed for SNA describe the distributions of relations among actors. Multiple-regression utilizing a Quadratic Assignment Procedure (QAP) was used to analyze these relationships. QAP is a nonparametric technique that is used to analyze network data in which observations are not independent [30]. Node-level regression was used to examine the influence of actors' attributes on their position in the SCALE-UP network. Similar to QAP multiple regression, estimate standard errors and significance will be estimated using the random permutations method. Both statistical testing procedures were performed in UCINET 6, a package for social network analysis. Table 1 gives an overview of our research questions and the statistical techniques that were used to examine them.

Results

We first examined the major avenues of how information about SCALE-UP spread and clustered the items from the survey into meaningful categories: (1) Talks/Workshops, (2) Interacting with other user(s), (3) Website, (4) Reading, (5) Don't know, and (6) Other. The results indicate that vast majority of respondents learned and heard about SCALE-UP through personal interactions with other users (57%), Talks/workshops (55%), and the SCALE-UP website (29%) (see Figure 1). Other avenues such as reading (e.g. books, articles, etc.) played a minor role in hearing and learning about SCALE-UP (16%). Similarly, both t*alk/workshops* and *interactions with other users* accounted for about a third of all the responses, followed by the SCALE-UP website (17%) and reading (9%) (see Figure 2).

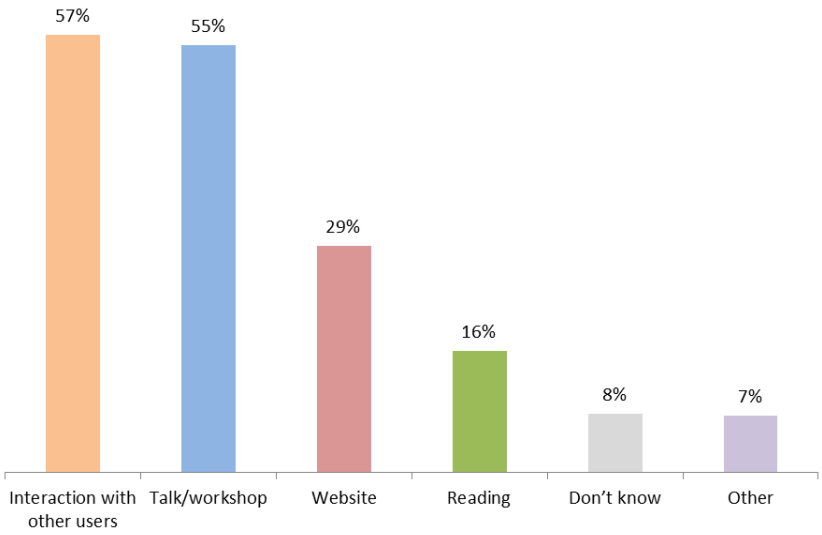

Figure 1 Sources of how respondents heard and learned about SCALE-UP

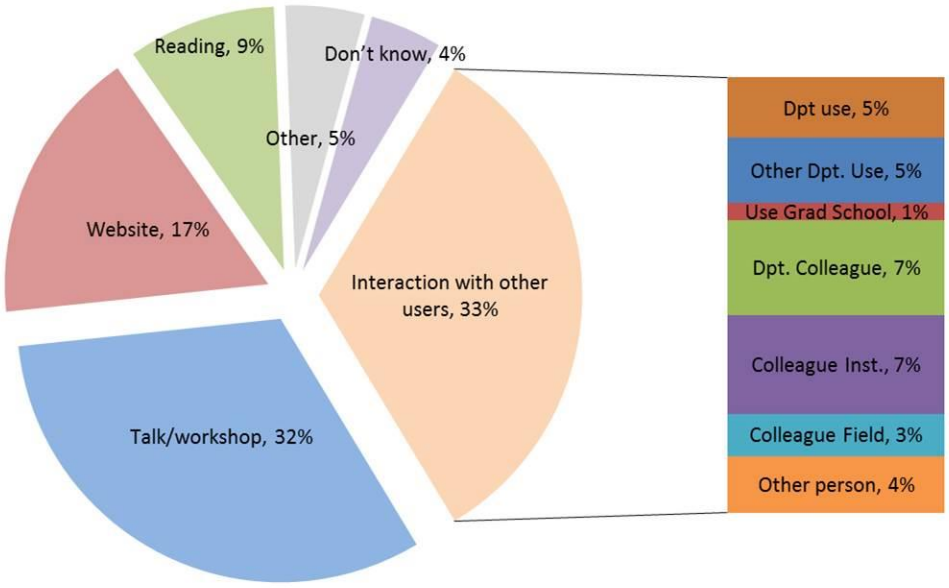

Figure 2 Proportion of responses for different SCALE-UP dissemination avenues

As described in *Participants and Data Collection*, we built our social network by connecting people named in the survey questions. Therefore, we social network represents the categories *interaction with other users* and *talks/workshops*. The resulting network consisted of 464 nodes with directed ties, defined by the direction of influence; ties are counted as *ingoing* if users have been influenced by other users, and as *outgoing* if users have influenced other users. Figure 3 summarizes some of the nodes' attributes, including gender, discipline, and user status. In addition, we included teaching experience – measured in years of teaching – in our subsequent analyses.

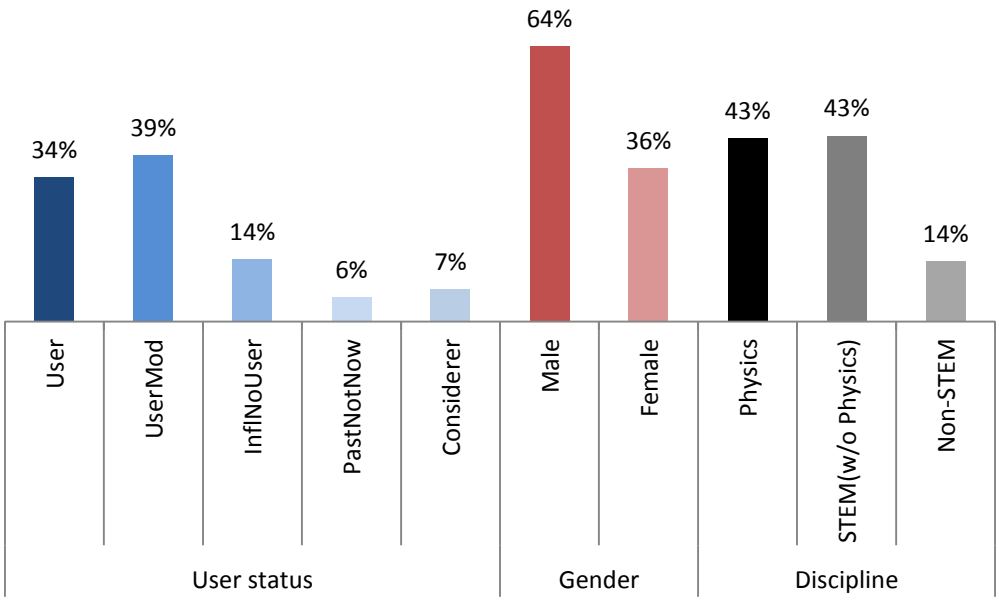

Figure 3 Distribution of node attributes

The network was analyzed as both directed as well as undirected (interactions between nodes). We found that the vast majority of respondents has only a low number of in-degree, out-degree or undirected ties (see Figure 4). Only the minority of respondents have two or more outgoing (16%), incoming (9%) or undirected ties (25%).

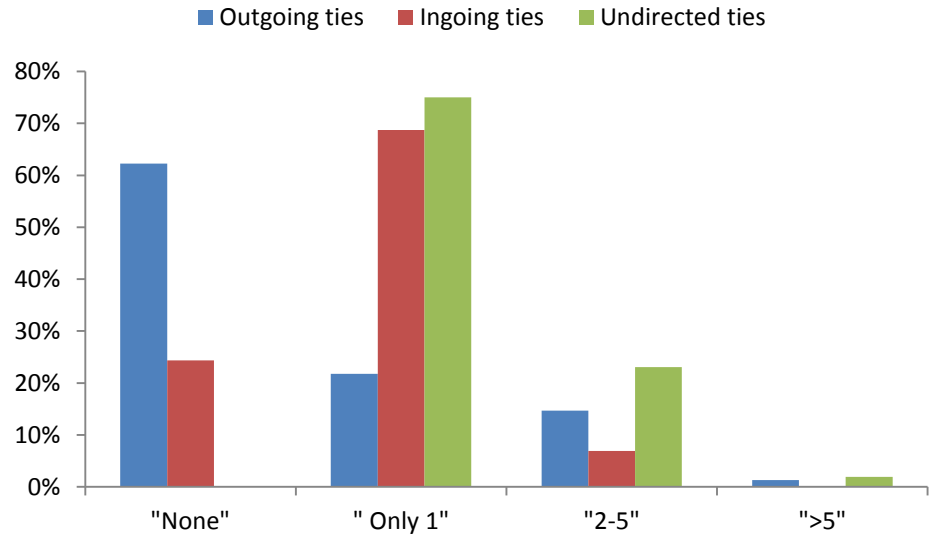

Figure 4 Proportion of outgoing, ingoing and undirected ties

The results of our visualization further support these findings regarding the structural property of the SCALE-UP network (see Figure 5). We can see that the SCALE-UP network consists of many small two- or three-actor networks as well as multiple larger clusters. For

example, the biggest cluster in the network is the Beichner cluster – in reference to Prof. Robert Beichner, the creator of SCALE-UP – that includes many actors from different departments and institutions (see Figure 5). To further understand if ties are formed on a local rather than on a global level, we created four different categories of ties that are formed between: (1) Actors working in the same department and the same institution, (2) Actors working in a different department and different institution, (3) Actors working in the same department but in a different institution, and (4) Actors working in different department but in the same institution. From the network visualization we can see that the majority of links are between actors of the same department and institution.

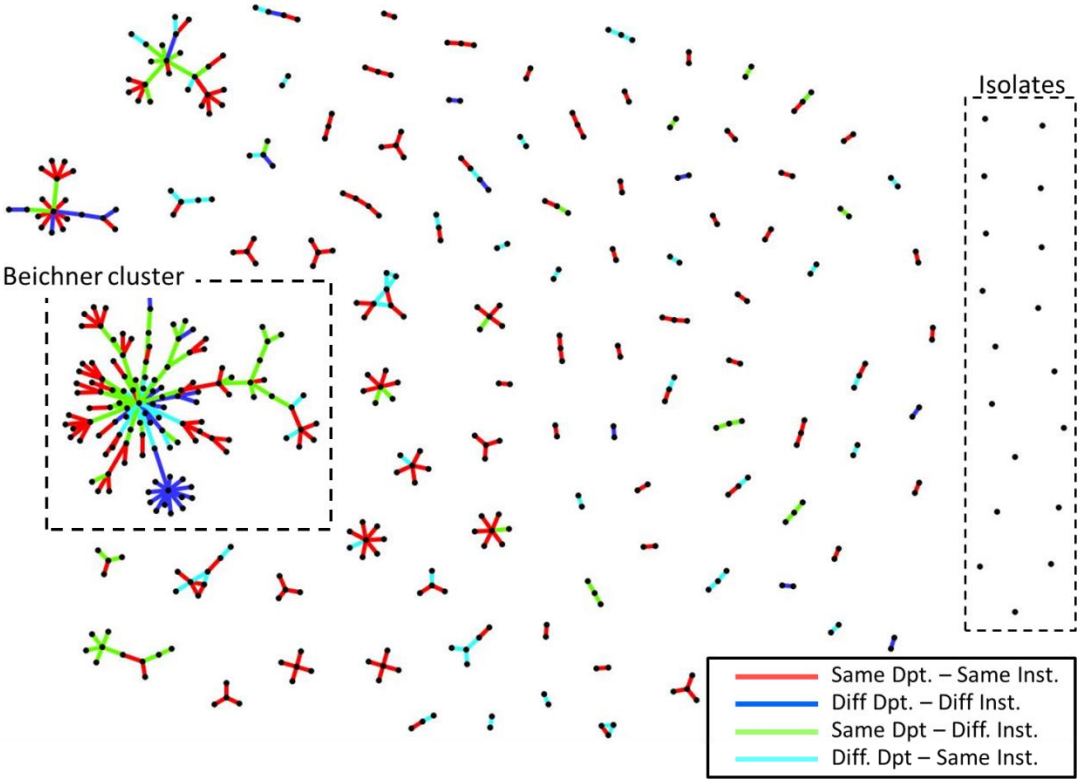

Figure 5 SCALE-UP network

The expanded view of the Beichner cluster, illustrates the basic mechanism of how SCALE-UP has been spreading through different departments and institutions (see Figure 6). In order to promote the use of SCALE-UP, Prof. Beichner conducted many workshops at interested academic departments throughout the world. As a consequence, participants of the workshops (green or blue arrows) often influence their departmental colleagues (red arrow).

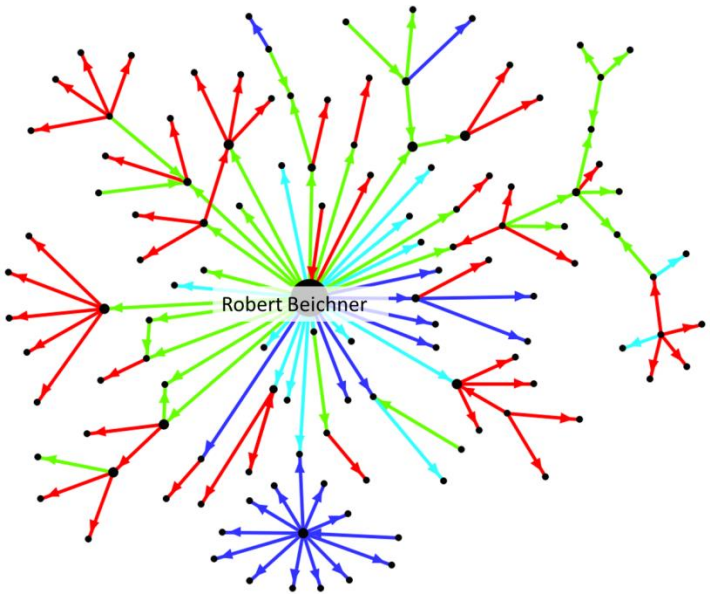

Figure 6 Expanded view of the *Beichner* cluster

To statistically confirm this observation, we conducted a multiple regression analysis examining how the structural equivalence of two actors – the same gender, the same department and institution and the same academic rank – influences their interaction in the SCALE-UP network. We found that the same gender and academic rank had no statistically significant effect on actors' interactions. In contrast, the affiliation to the same department and institution as well as to a different department but to the same institution showed statistically significant effects on actors' interactions. However, the actual effect was small to medium, indicating that actors with the same affiliation share 0.17 interactions more than actors that are not affiliated to the same department and institution (See Table 2).

Table 2 MR-QAP coefficients for structural equivalence analysis

Independent variables	Regression coefficients
Same department and same institution	0.177***
Different department and same institution	0.027***
Same department and different institution	0.0017
Different institution and different department	-0.0012
Same gender	0.00017
Same rank	0.00007

**p<05, **p<.01, ***p<.001*

Next, we examined if certain attributes affect actors' position and influence in the network. As mentioned in the methodology section we selected four different indicators and tested our model using a node-level multiple regression. As evidenced by our results, we did not find any statistically significant results for any of the attributes (gender, discipline, teaching experience, and user status) (see Table 3). Respondents that described themselves as influenced users of SCALE-UP, had more outgoing ties (outdegree centrality) as well as reached more nodes (out 2-step reach centrality) than self-described SCALE-UP users. Male respondents had

fewer outgoing ties, lower reach and were less central to the network than female respondents. However, none of these results were statistically significant. Similarly, the effect of teaching experience on any of the examined network measures was negligible (see Table 3).

Table 3 OLS Regression coefficients for subgroup differences in outdegree, indegree, out-k-step (two), and betweenness centrality

	Outdegree centrality	Indegree centrality	Out 2-step reach centrality	Betweenness centrality
Differences in user status[a]				
Modified Users	0.143	0.039	0.385	-0.507
Influenced but not users	1.484	-0.122	2.561	-0.347
Considerer	-0.311	-0.045	-0.242	-0.396
Past users	-0.042	0.050	0.141	-1.109
Gender differences				
Male	-0.602	0.131	-1.122	-1.268
Teaching experience	0.006	-0.002	0.002	-0.017
Different disciplines[b]				
STEM (w/o Physics)	-0.074	0.080	-0.095	-1.865
Non-STEM	-0.363	0.033	-0.410	-2.128

[a]*Dummy-coded variables with "User" as a reference*
[b]*Dummy-coded variables with "Physics" as a reference*

Conclusion and Future work

While new research-based instructional strategies are being disseminated constantly, monitoring the use of RBIS by practitioners deserves more attention. In this paper, we present the use of social network analysis (SNA), to examine how a particular research-based instructional strategy – SCALE-UP – has spread among instructors in STEM and non-STEM fields.

Our preliminary results indicate that most instructors hear and learn about SCALE-UP through workshops, talks, and direct interaction with other users of SCALE-UP. Specifically, the interaction between instructors from the same institution (inter- and intradepartmental) appears to be the dominant mechanism of how respondents discover and use SCALE-UP. This finding is consistent with previous research on the impact of interpersonal channels on teaching behaviors [1,31,32]. We also found that most actors in our network have only few outgoing ties with other actors, suggesting that SCALE-UP dissemination has been mainly driven by few very influential nodes, namely the creator of SCALE-UP, Robert Beichner. This centralized dissemination structure is in contrast with other major initiatives. For example, the POGIL instructional strategy [33] has purposeful developed decentralized, community-based dissemination networks. Differences between these two dissemination structures and the results are important areas for future study.

Contrasting the results of previous findings regarding the influence of homophily [34–36] -

the principle that a tie between similar people occurs with a larger probability than among dissimilar people – we could not find that individual attributes such as gender or rank increased the rate of interaction between members of the SCALE-UP network. Instead, we found that SCALE-UP interaction between current and prospective users increases as a function of proximity.

This analysis focused exclusively on the SCALE-UP network in the US, limiting the overall data size as well as neglecting potential structural differences in education systems abroad. Furthermore, implementing SCALE-UP often requires a substantive spatial and financial commitment, transforming existing classrooms to accommodate for the interactive nature of the learning activities. Therefore, future work should focus on building a more comprehensive model of how all the different individual, departmental and institutional level factors affect the dissemination of RBIS. Our dataset consisted mainly of self-report data and was limited to educators interested in SCALE-UP. We suggest that future studies expand the examination of collaborative structures in the RBIS community using published journal or conference papers, traffic on RBIS-related websites, or large national databases such as the faculty survey administered by the Higher Education Research Institute (HERI). Converting these data sources into relational data, could yield critical insights into the development of RBIS communities over time.

Acknowledgements

This research was supported by the U.S. National Science Foundation through grant 1223564. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

References

1. Dancy M, Henderson C. Pedagogical practices and instructional change of physics faculty. *American Journal of Physics*. 2010;78:1056.

2. Handelsman J, Ebert-May D, Beichner R, et al. Scientific teaching. *Science*. 2004;304(5670):521–522.

3. Henderson C, Dancy MH. Impact of physics education research on the teaching of introductory quantitative physics in the United States. *Physical Review Special Topics-Physics Education Research*. 2009;5(2):020107.

4. Redish EF. *Teaching physics: With the physics suite*. John Wiley & Sons Hoboken, NJ; 2003.

5. Seymour E. Tracking the processes of change in US undergraduate education in science, mathematics, engineering, and technology. *Science Education*. 2002;86(1):79–105.

6. Fairweather J. Linking evidence and promising practices in science, technology, engineering, and mathematics (STEM) undergraduate education. *Board of Science Education, National Research Council, The National Academies, Washington, DC*. 2008.

7. Henderson C, Beach A, Finkelstein N. Facilitating change in undergraduate STEM instructional practices: an analytic review of the literature. *Journal of Research in Science Teaching*. 2011;48(8):952–984.

8. Finkelstein ND, Pollock SJ. Replicating and understanding successful innovations: Implementing tutorials in introductory physics. *Physical Review Special Topics-Physics Education Research*. 2005;1(1):010101.

9. Pollock SJ, Finkelstein ND, Kost LE. Reducing the gender gap in the physics classroom: How sufficient is interactive engagement? *Physical Review Special Topics-Physics Education Research*. 2007;3(1):010107.

10. Sabella M, Bowen S. Physics Education Research with Special Populations: How do we characterize and evaluate the special needs and resources of students who are underrepresented in STEM education: Poster Presented at the AAPT Physics Education Research Conference (Madison, WI). In: *Poster Presented at the AAPT Physics Education Research Conference (Madison, WI)*.; 2003.

11. Redish EF, Saul JM, Steinberg RN. On the effectiveness of active-engagement microcomputer-based laboratories. *American Journal of Physics*. 1997;65:45.

12. Sharma MD, Johnston ID, Johnston H, et al. Use of interactive lecture demonstrations: A ten year study. *Physical Review Special Topics-Physics Education Research*. 2010;6(2):020119.

13. Wittman M. On the dissemination of proven curriculum materials: RealTime Physics and Interactive Lecture Demonstrations. *Orono: Dep of Physics and Astronomy, University of Maine*. 2002.

14. Henderson C. The challenges of instructional change under the best of circumstances: A case study of one college physics instructor. *American journal of physics*. 2005;73:778.

15. Henderson C. Promoting instructional change in new faculty: An evaluation of the physics and astronomy new faculty workshop. *American Journal of Physics*. 2008;76:179.

16. Valente TW. *Network Models of the Diffusion of Innovations (Quantitative Methods in Communication Series)*. NJ: Hampton Press; 1995.

17. Valente TW. Social network thresholds in the diffusion of innovations. *Social networks*. 1996;18(1):69–89.

18. Kempe D, Kleinberg J, Tardos É. Maximizing the spread of influence through a social network. In: *Proceedings of the ninth ACM SIGKDD international conference on Knowledge discovery and data mining*.; 2003:137–146.

19. Eubank S, Guclu H, Kumar VA, et al. Modelling disease outbreaks in realistic urban social networks. *Nature*. 2004;429(6988):180–184.

20. Kempe D, Kleinberg J, Tardos É. Influential nodes in a diffusion model for social networks. In: *Automata, languages and programming*. Springer; 2005:1127–1138.

21. Christakis NA, Fowler JH. The spread of obesity in a large social network over 32 years. *New England journal of medicine*. 2007;357(4):370–379.

22. López-Pintado D. Diffusion in complex social networks. *Games and Economic Behavior*. 2008;62(2):573–590.

23. Coburn CE, Russell JL. District policy and teachers' social networks. *Educational Evaluation and Policy Analysis*. 2008;30(3):203–235.

24. Penuel W, Riel M, Krause A, Frank K. Analyzing teachers' professional interactions in a school as social capital: A social network approach. *The Teachers College Record*. 2009;111(1):124–163.

25. Beichner RJ, Saul JM. Student-centered activities for large-enrollment university physics (SCALE-UP). In: *Proceedings of the Sigma Xi Forum on the Reform of Undergraduate Education*.; 1999:pp. 43-52.

26. Beichner RJ, Saul JM, Allain RJ, Deardorff DL, Abbott DS. *Introduction to SCALE-UP: Student-centered activities for large enrollment university physics*. US Department of Education, Office of Educational Research and Improvement, Educational Resources Information Center; 2000.

27. Johnson DW, Maruyama G, Johnson R, Nelson D, Skon L. Effects of cooperative, competitive, and individualistic goal structures on achievement: A meta-analysis. *Psychological bulletin*. 1981;89(1):47.

28. Prince M. Does active learning work? A review of the research. *Journal of Engineering Education*. 2004;93:223–232.

29. Vygotsky LS. *Mind in society: The development of higher psychological processes*. Harvard Univ Press; 1978.

30. Barnett GA. *Encyclopedia of social networks*. Sage; 2011.

31. Borrego M, Froyd JE, Hall TS. Diffusion of engineering education innovations: A survey of awareness and adoption rates in US engineering departments. *Journal of Engineering Education*. 2010;99(3):185–207.

32. Rogers EM. *Diffusion of innovations*. Simon and Schuster; 2010.

33. Moog RS, Creegan FJ, Hanson DM, Spencer JN, Straumanis AR. Process-Oriented Guided Inquiry Learning: POGIL and the POGIL Project. *Metropolitan Universities*. 2006;17(4):41–52.

34. McPherson JM, Smith-Lovin L. Homophily in voluntary organizations: Status distance and the composition of face-to-face groups. *American sociological review*. 1987.

35. McPherson M, Smith-Lovin L, Cook JM. Birds of a feather: Homophily in social networks. *Annual review of sociology*. 2001:415–444.

36. Ruef M, Aldrich HE, Carter NM. The structure of founding teams: Homophily, strong ties, and isolation among US entrepreneurs. *American sociological review*. 2003;68(2):195–222.