
AC 2011-1863: BIG: UNITING THE UNIVERSITY INNOVATION ECOSYSTEM

Douglas E. Allen, Bucknell University

Steven B. Shooter, Bucknell University

Steve Shooter, Ph.D., P.E. is Professor of Mechanical Engineering at Bucknell University where he has taught for design, innovation and robotics for 16 years. He has published over 90 peer-reviewed papers and been PI or Co-PI on grants from NSF, ONR, NIST, ARDEC in addition to industry. As a registered professional engineer he also consults extensively with industry on design projects and formulation of innovation strategies.

BIG: Uniting the University Innovation Ecosystem

Abstract

While there are many similarities and interesting differences among approaches to innovation in various disciplines, there is always one common element: The strong drive to make an impact. The goal of innovation is change, to make someone or something better. A cursory examination indicated a large number of activities at the University that are directly or closely linked to the theme of innovation. These activities have been largely enacted by faculty who have a strong interest in a particular project. Many have been extremely successful. While many of these faculty meet informally with others to discuss their initiatives and efforts, there had not been an university-wide discussion. A major impetus behind the initiative described in this paper was to intentionally unite these related elements through creating an innovation ecosystem. An innovation ecosystem is the result of interactions between diverse stakeholders in a community with a vision of achieving goals through innovation or targeted creativity. Toward this end, faculty leaders in innovation from diverse disciplines gathered in a workshop to explore tactics to nurture, support and promote these activities and new initiatives. Specifically, this group of faculty from engineering, management, arts, humanities and social sciences met to:

1. Build an awareness of all of the diverse activities and identify how they tie into the Innovation Ecosystem.
2. Identify university stakeholders and administrative support for innovation activities.
3. Establish a strategic plan for uniting the University Innovation Ecosystem that capitalizes on our uniqueness of liberal arts and professional programs.. This includes desired outcomes and identified resources needed to achieve them.
4. Develop an interdisciplinary course offering for Spring 2011 called “Impact! Exploring Innovation across Disciplines”.

The workshop has resulted in the engagement of faculty, students and administrators from domains of understanding across engineering, management, arts, humanities, sciences and social sciences through the formation of BIG (Bucknell Innovation Group). The primary goal of the group is to foster the coalescence of a growing cadre of citizens in the University community interested in combining interdisciplinary perspectives and tools in novel and nuanced ways to address complex and multidimensional challenges in the environments we inhabit. In the context of this collectivity, the term “innovation” is meant to be construed broadly, encompassing the creation of novel ideas that take on requisite form such that they provide some type of additional value (social, economic, aesthetic, etc.) to the world. This paper will describe the structure, methods, challenges and outcomes of the effort to unite the university innovation ecosystem across disciplines.

Introduction

An ecosystem is defined as a system formed by the interactions of organisms in a physical environment. By extension, an Innovation and Entrepreneurship Ecosystem is the result of interactions between diverse stakeholders in a community with a vision of achieving goals through targeted creativity. A key point of emphasis is that it is these interactions, that is the network connecting the participants, which leads to an outcome greater than the sum of the individual pieces. In “How to Build a Successful Innovation Ecosystem: Educate, Network, and Celebrate” (2008)¹, a review of more than a dozen regional development cases, William Aulet, Director of the MIT Entrepreneurship Center finds that two elements are critical for a vibrant and sustainable innovation ecosystem: *skills and culture*. He notes that “entrepreneurs must be armed with skill sets which include knowledge and experience of entrepreneurship, and that these can be taught.” In order to enact change that is sustainable, it is necessary to transform the culture of the university to one that fosters ideals of innovation and entrepreneurship.

A cursory examination of activities at Bucknell University indicated a large number that are directly or closely linked to the theme of innovation. These activities have been largely enacted by faculty who have a strong interest in a particular project. Many have been extremely successful, while others have languished. Many of these faculty meet informally with others to discuss their initiatives and efforts. While laudable, these pods of activities and the stakeholders who support them do not make a cohesive university innovation ecosystem. Thomas W. Peterson, Assistant Director for Engineering for the National Science Foundation, notes that a key characteristic for “Creating an Innovation Ecosystem”, (2009)², is that “faculty are involved along the innovation continuum, working with industry at all stages.” Building a university-wide Innovation Ecosystem requires aligning many diverse stakeholders to engage in a university-wide initiative to formulate a strategic plan.

The Bucknell Context

Formation of BIG ecosystem can be seen as an act of innovation in itself, and as with any innovation, it was created at a specific historical juncture and in a specific cultural and social context. Taking into account this backdrop should help the reader understand dynamics of BIG’s development at Bucknell, and also provide the opportunity to make comparisons vis a vis other institutions. Though some of the specifics will certainly differ across various types of institutions, there will likely be high level themes that readers in different environments can relate to and learn from.

Strategic Context

Bucknell is officially classified by the Carnegie Foundation as a liberal arts institution, making it the largest liberal arts university in the country. At the same time, the traditional liberal arts disciplines are supplemented by professional offerings in areas such as education, engineering, management, music, and theater and dance. Structurally, Bucknell has a College of Engineering that houses six departments and a College of Arts and Sciences that houses over 30 departments and programs as well as a School of

Management. As such, unofficially, Bucknell can be seen as falling in the middle of the spectrum between a liberal arts college and comprehensive university. From a strategic perspective, questions about matters such as delimiting its “competitive set” or frame-of-reference schools, resource allocation, and its overall future strategic direction, become complicated at times due to this hybrid status.

Strategic concerns such as these partially underlie the impetus behind the formation of BIG. Historically, Bucknell has emphasized that its unique competitive advantage lies in the fact that students can choose from a wide variety of academic programs characteristically available at a comprehensive university while learning in the closer confines of a personalized liberal arts educational environment. More recently, a prominent line of thought is that Bucknell’s hybrid status is a unique competitive advantage that should be leveraged differently in light of trends in higher education and the challenges associated with educating students prepared to be citizens and professionals in an increasingly complex and dynamic globalized world. From the perspective of professional programs, there is an increased recognition for the need to prepare professionals who not only have mastered specialized technical knowledge, but also transcendent skills such as cultural understanding, global awareness, emotional intelligence, and creative right-brain capabilities—perspectives often at the center of liberal arts offerings and that could be effectively imparted to students in the professional programs through greater integration. For example, in the case of engineering programs in the U.S., graduates with this latter set of skills should be better prepared to compete in a global workforce comprised of engineers educated elsewhere and possessing comparable levels of technical preparation. Integration of the liberal arts with the professions (e.g., engineering, business, education, etc.) can provide the practical contexts for application and technical understandings necessary for preparing graduates capable of achieving such goals.

Cultural Context

While it is important to understand the strategic context in which BIG arose, the actual act of creating BIG exists more at the level of tactical execution than strategic planning. In other words, BIG is a means for integrating faculty and students from diverse disciplines in shared pursuit of interests related to innovation and creativity. And while strategic vision is important to any institution, it is generally recognized that the tactical “blocking and tackling” necessary to achieve a strategic vision can be equally as challenging as deriving the original vision itself. Furthermore, it is widely recognized that one dominant factor that impacts the tactical pursuit of strategy is culture, and in the case of BIG, culture was a prominent force shaping its formation.

Cultural challenges can be seen to be tangentially rooted in the classic treatise, *The Two Cultures* (1960)³, in which C. P. Snow outlined the divide between two academic cultures which he classified as the sciences and the humanities. Snow claimed that many from the sciences questioned the relevancy of the humanities and had little inclination to struggle through a novel, while many from the humanities had little familiarity with important scientific principles and generally viewed the sciences as intellectually second-rate. While Snow’s characterization of the two cultures has been

questioned over the years, as BIG was forming, it was readily apparent that more nuanced versions of these differences existed among the diverse faculty participating. Due to the project's overall focus on the topic of *innovation*, it was anticipated that apprehensiveness due to these cultural differences might be greatest among those from the humanities. Faculty from engineering and management were comfortable with the concept of innovation, while such a focus was less central to the academic lives of faculty from the humanities. The terms innovation and entrepreneurship are often closely linked. However, entrepreneurship can have negative connotations of profiteering and greed among some constituencies. An effort was made to identify the commonalities of knowledge and skills associated with innovation and entrepreneurship. As a result, the concept of innovation was defined broadly as: the development of novel ideas that provide some type of added value (social, economic, aesthetic, intellectual, etc.) to the world. This is illustrative of the fact that many from the humanities rightly recognize the important role that language plays in shaping our understandings. In short, when trying to transcend cultural differences, agreed upon language really matters.

Another anticipated tension relevant to the creation of BIG is related to Wallace Stanley Sayre's oft repeated quip, "The politics of the university are so intense because the stakes are so low."⁴ As Sayre's observation implies, this category of cultural resistance seems to be endemic to university life, and any casual observer of Bucknell's culture would recognize that Bucknell is no exception. Those endeavoring to create new initiatives are inevitably greeted with suspicion as to motives related to material resources, power, and status or prestige. Such suspicions are fueled by the perception that various disciplines have been treated unevenly with respect to resource allocation and possess different levels of status within the University.

In closing, taking into account these historical, social and cultural contexts at Bucknell was important when organizing and structuring the BIG workshops, the details of which we turn to in the next section.

Organizing BIG: Structure, Process, and Content

Participants

In July of 2010, an invitation was sent to 20 faculty from across the University to participate in a workshop centered around the themes of innovation and the idea of "making an impact." Of the 20 invited, 17 accepted our invitation, and the disciplines represented included art and art history, comparative humanities, education, engineering, english, management, music, and theater and dance. An initial goal was to attract enough participants to represent the diverse set of disciplines across campus while limiting the total number of faculty so as to not make this initial planning group too unwieldy. An effort was also made to balance participation so that no discipline was represented or perceived to be represented more heavily. In addition to the consideration for intellectual diversity, we looked for a few other characteristics in invitees. One criterion that was important was to invite those faculty identified as "doers," or people who were innovators with respect to their careers and endeavors on campus. Also, in light of concerns for some of the anticipated cultural barriers that might arise chronicled above, there was an

emphasis on inviting faculty who were pluralistic and open-minded in their thinking with respect to some of the potential barriers we anticipated arising. For example, faculty who had collaborated in cross-disciplinary projects in the past were emphasized. Since the initial goal was for the project to gain momentum, including strong skeptics early on was not deemed advisable. Finally, given Bucknell's relatively small size, there was an opportunity to involve faculty who had personal relationships with each other. This is not to say that many of those invited did not have significant differences in terms of worldview and perspective, but at the same time they were people who would feel comfortable socializing together over a cup of coffee. Careful consideration of the participants was a key factor in the success of the discussions and cohesiveness among the entire group to build momentum. The intent was to open the group broadly to the university community later.

Workshop Format and Setting

The workshop was scheduled for two days the week before the fall 2010 semester began. (Please see Appendix A for workshop agenda.) Participants also committed to two three-hour mini workshops scheduled during fall semester. The follow-up mini workshops that took place in September and November allowed the group to convene and socialize again. While numerous email traffic occurred in the interim, there is no substitute for face-to-face gatherings. Also, this timing enabled the group to take some time to reflect on all of the discussions and findings that arose during the initial two-day session. Finally, it also provided time for participants to prepare homework assignments prior to the second and third meetings. In short, the elongated schedule permitted the group to maintain contact and momentum through the entire fall semester.

During the two-day session, the days began at 8:30 and concluded at 5:00 p.m. Breakfast was available in the morning, lunch was also served, and there were coffee breaks during the morning and afternoon sessions. In addition to appealing to participants' appetites, each faculty member was provided with a \$1,000 stipend for participating in the initial two-day session and follow-up meetings. Given all the time participants put into meeting, preparing for later meetings, exchanging emails, etc., faculty would have been receiving a paltry hourly wage, but it gave some economic benefit. All of the resources devoted toward the workshop and follow-up meetings were orchestrated to create an atmosphere of companionship and shared intellectual interest. Symbolically, the fact that Bucknell's administration provided the requisite financial support was an important sign to all participants that this was being taken seriously and had potential to succeed. Furthermore, because resources were provided, it was understood that the group was accountable to upper-level administration to show real results, which enhanced the earnest nature in which all approached the project.

Beyond the timing of the workshop meetings, attention was given to the atmospherics of the meeting space. A room that was appropriate in scale to the number of participants and that had moveable tables and chairs was selected. To foster an atmosphere of unbridled brainstorming, the tables and chairs of the room were assembled in a totally random formation prior to participants arriving. Several white boards were used and lots of markers were available throughout the room. Poster-sized Post-It sheets

were readily available, providing breakout groups flexibility in capturing the results of their work. Dozens of traditional-sized Post-It pads were also distributed throughout the room.

Content and Topics of Workshop

Prior to attending the first day of the workshop, participants were asked to arrive having completed an intentionally vague assignment to prepare a description of an example of a personal impact, innovation, or creative act to share with the group. They were asked to communicate this in about four minutes, and after a few prefatory remarks by the organizers, the first session opened with participants contributing their examples. This exercise permitted people to become engaged and speak about something they were passionate about. It also permitted everyone to get to know a little more about one another. The diversity of contributions was remarkable, and it was also interesting to note the difference in approaches, ranging from carefully managed PowerPoint presentations and videos lasting almost exactly four minutes to more extemporaneous narratives lasting as long as 15 to 20 minutes. A few insights could be gleaned from this initial exercise. First, the diversity in terms of intellectual cultures was clearly reflected in the stylistic approaches to the assignment. As a result of this diversity, it became obvious that free reign would have to be given to the group, and the organizers could not exercise too much control over the timing and flow of discussion. Also, it was clear that such an exercise broke the ice among participants and allowed people to relate to one another. An overall sign of the extent of camaraderie that evolved early on was the fact that by the end of the day, people were referring to the entire collectivity and project using the pronoun “we,” instead of using some third-person reference.

The next session asked faculty to break out into groups and begin performing a strategic analysis of the environment, capturing the strengths, weaknesses, opportunities and challenges associated with creating an interdisciplinary movement on campus focused on ideas related to innovation and creativity. The breakout groups came back together and collectively discussed the results, which were captured in a PowerPoint slide used in the next session that occurred after lunch. After lunch, administrators were invited to attend the afternoon session, and results of the S.W.O.T. analysis were presented to them for their reactions. Administrators then commented on the role that a focus on innovation and creativity would play within the University and expressed their support of exploring the initiative. After the administrators left, the faculty debriefed on what was learned for the day. Before concluding, participants were asked to complete a homework assignment prior to arriving the next morning. The assignment was to benchmark four possible programs from other universities that were related to innovation, creativity, or entrepreneurship, noting elements that were particularly exciting, or conversely, extremely disconcerting.

Day two opened with informal discussion over breakfast followed by input from each member regarding what they really liked or disliked about the program they had studied. The second morning session combined results of the environmental S.W.O.T analysis and competitive analysis, asking participants to offer some preliminary visions of what the group could become. Following this discussion of where the group wanted to

go, the final session of the morning focused on defining necessary resources to get there. The final afternoon of the two-day workshop was devoted to conceptualizing an interdisciplinary course that would focus on themes of innovation and would take the title, “IMPACT: Exploring Innovation Across the Disciplines.”

By the end of the initial two-day workshop, it was clear the participants were not able to envision what exact form on campus an initiative focused on innovation would take. So, the primary assignment for the first follow-up meeting in September was to benchmark some other programs both outside Bucknell and within Bucknell, paying particularly close attention to their structure and organization. The September meeting focused on defining exactly what the movement was going to be, and it was at this meeting that consensus formed around the formation of a loosely defined group entitled the Bucknell Innovation Group (BIG). It is important to note that the faculty felt it was important to have a name and created this collectively. At this meeting, an emphasis was placed on going beyond strategic considerations to having the group actually do innovation-related things together. For example, the group agreed to begin reading and meeting to discuss books related to innovation. Fortunately, at the time BIG was being formed, the University had just begun a year-long forum series entitled, “Creativity: Beyond the Box,” and BIG members were invited to meet and dine with nationally recognized experts in innovation and creativity who were visiting to deliver high-profile, university-wide talks.

As BIG was beginning to take shape, the final planning meeting of the semester took place in November. Its primary focus was on defining important stakeholders BIG would interface with. These stakeholders included students, alumni, faculty, and the local community. Discussion also began to address a possible governance structure for BIG, as well as some effective means of communication to maintain contact among group members. The outcomes of this meeting and the entire process are reported in the following section.

Outcomes of BIG Planning Process

As noted above, the BIG workshops brought together seventeen faculty members from disciplines across the university, many of whom would never thought of identifying themselves as *innovators*. Perhaps the greatest achievement was getting this group to coalesce and agree to be identified with a university initiative on innovation. Formulating the name BIG (Bucknell Innovation Group) and having faculty excited about being a part of it was a tremendous milestone. The group recognized the importance of the collective and felt it was important to establish who they are and what their mission is. The importance of this became very clear as the follow-up mini workshops and activities were held during the fall semester. Other faculty started to ask about the group and what we were doing. Faculty who were unavailable for the summer workshop joined the group during the fall. It was very important to them to get a sense of who we were and what we were doing, as they were not a part of the initial socialization in the collective perspectives on innovation.

BIG formulated a mission statement that states that its “primary goal is to foster the coalescence of a growing cadre of citizens in the Bucknell community interested in combining interdisciplinary perspectives and tools in novel and nuanced ways to address complex and multidimensional challenges in the environments we inhabit. In the context of this collectivity, the term “innovation” is meant to be construed broadly, encompassing the creation of novel ideas that take on requisite form such that they provide some type of additional value (social, economic, aesthetic, etc.) to the world. The result will be the coalescence of a growing cadre of citizens in the Bucknell community who have deep skills and expertise in their respective fields and who also embrace interdisciplinarity in their own orientations and through their collaborations with others. This group will foster the proclivity to reflect critically on the functioning of the world and environments we inhabit and devise creative contributions in response.”

It was recognized and acknowledged that this mission statement is intended to be dynamic and evolve. In fact, as of this writing, it has been edited and tweaked again as people engage more strongly with the group and suggest alternative language. As alluded to above, succinct and exact language is a cornerstone of the liberal arts. Understandably, there were individuals in BIG who carefully reviewed the language for nuance and effect.

BIG immediately set out to show value to the collective, even as it labored to establish identity. The University had established a yearlong forum series on creativity called Bucknell Beyond the Box. This series brought nationally renowned speakers to campus. BIG established a reading group to correspond with the visit of Dan Roam, author of *The Back of the Napkin: Solving Problems and Selling Ideas with Pictures* (2009)⁵. Members of BIG met with Roam and participated in a workshop with him on his approach. Another example is that a professor of English established an exercise in his public speaking class requiring students to give a talk on innovation. As one might expect, the students struggled with the concept of innovation and where they should focus their talk. Professor X, from Engineering, gave a guest lecture to the class to help them organize their ideas for the assignment. Additionally, a professor in Music gave a workshop in the university-wide Faculty Learning Series on creativity and teams. He described the roles and teamwork of musicians in jazz music and demonstrated this through performance with the band. He explained that while the music is being improvisationally created, each member has a role of contribution to produce a melodious effect.

BIG recognized the need to identify specific initiatives to move forward in uniting the university innovation ecosystem. They created a list of possible initiatives in categories of curricular, co-curricular, extra-curricular, faculty development, and civic engagement. A questionnaire was administered to the group to help gain a sense of interest. Individuals were asked to rate the importance of the initiative on a seven-point scale (very important to unimportant) to BIG and their willingness to participate (yes/no). Names were associated with responses to best identify individuals for initiatives. The intent was not to simply gain approval, but to help break into teams along lines of interest.

Curricular initiatives were all rated high for importance and all received a strong showing of support for participation. Figure 1 shows the results of faculty interest in participating in curricular activities. The activity receiving the highest rating was “development of exercises and modules for existing classes.” All but one of the participants was interested in doing this. This is a heartening result. It is also a good first step to engage people. The one person declining commented on near-term demands on time as an impediment. There was also strong interest (81%) in participating in a team-taught course on innovation from an interdisciplinary perspective. Additionally, There was a strong willingness (81%) visit each other’s classes as both a guest lecturer and observer. Eighty-eight percent were willing to participate in the development of a five-year plan for BIG. Construction of a minor in innovation garnered 73% willingness to participate. Development of new courses received the lowest participation score at 63%. It is important to note that different individuals recognized potential limitations on their time in identifying initiatives. One individual commented on the importance of exploring a minor, but explained reluctance to participate because of a feeling of lack of qualification (individual is untenured). This same individual has wholeheartedly supported the development of the course *Impact: Exploring Innovation Across Disciplines*. It was clear from the results that the curricular initiatives garnered the most interest in participation.

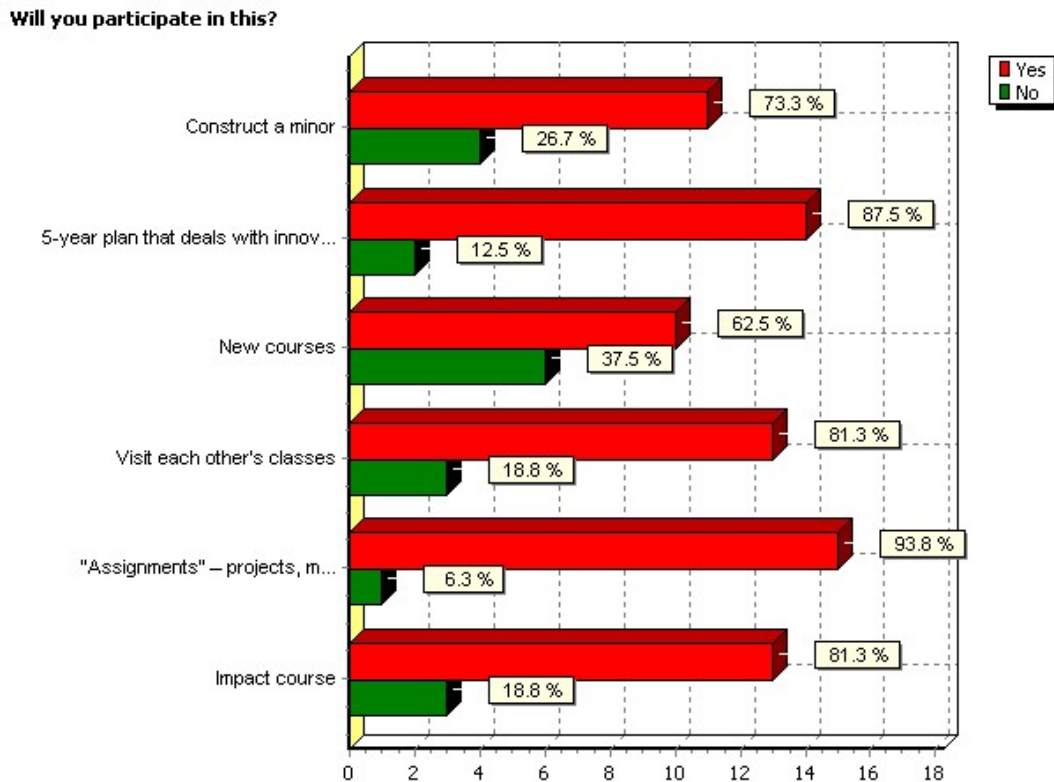


Figure 1: Interest in Curricular Initiatives

Co-curricular activities also showed high relevance to BIG and garnered interest in participation as shown in Figure 2. Providing evening talks and class visits were rated

highly in importance and participation with 91% and 100%. Student exhibitions saw a wider range of importance to BIG and student competitions garnered some “unimportant” responses. While 71% said they would participate in student exhibitions of innovation activities, 67% said they would not participate in the development of student competitions of innovation. This result perhaps reflects some cultural proclivities of the diverse domains represented.

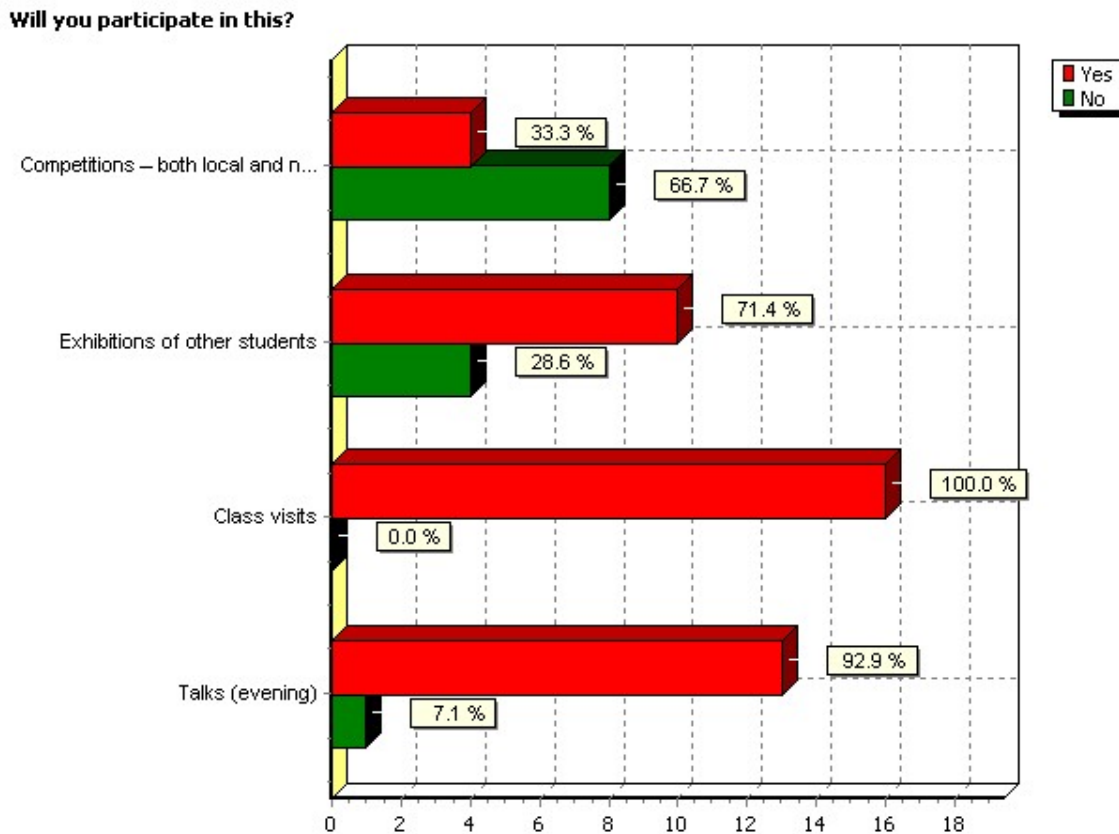


Figure 2: Interest in Co-Curricular Initiatives

Extracurricular activities saw an even greater spread in expression of importance and interest as illustrated in Figure 3. The greatest interest involved engaging alumni, with 60% willing to participate. Student clubs saw some interest with 46%. Engagement with existing organizations saw less interest in engagement with specific organizations such as Common Ground (a student-run organization that challenges people to think critically about issues of diversity in an environment open to all perspectives). There was the least interest (31%) in working with the newly-formed affinity networks such as the Entrepreneurship Network or Consumer Products Network. But there was interest in developing relationships with alumni for class guests and evening talks. Field trips to alumni organizations were viewed as highly desirable and 71% would participate in developing these opportunities. There was considerable interest in participating in the development of student life opportunities. Among these were the development of a residential college and special interest housing, coffee talks and regular “hang-out” time.

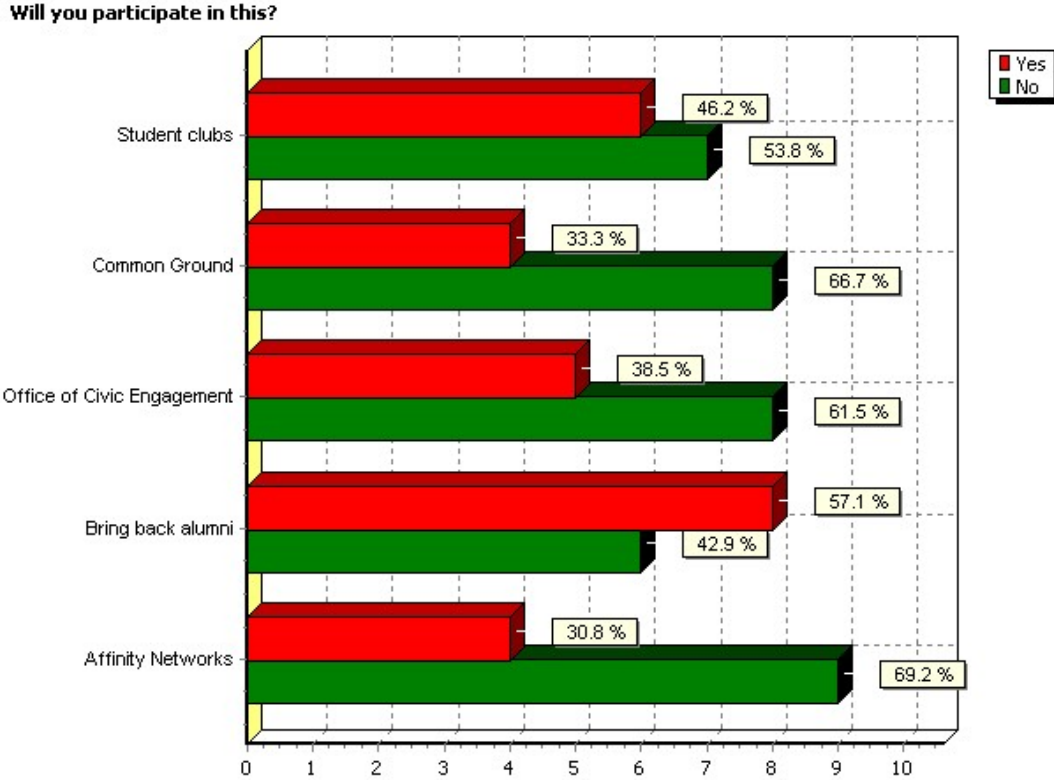


Figure 3: Interest in Participation in Extra-Curricular Initiatives

Faculty development and strategies to engage faculty saw strong appeal and support as shown in Figure 4. Teaching in each other’s classes or sitting in each other’s classes was high at 86%. There was also a strong interest in working on projects together (86%) and holding reading group meetings (86%). Other areas of strong support including publishing together, proposal writing, shared “snap talks”, socials, and “open houses” to each other’s laboratories, studios and workspaces. In general, the group was greatly interested in pursuing opportunities to continue to stay connected.

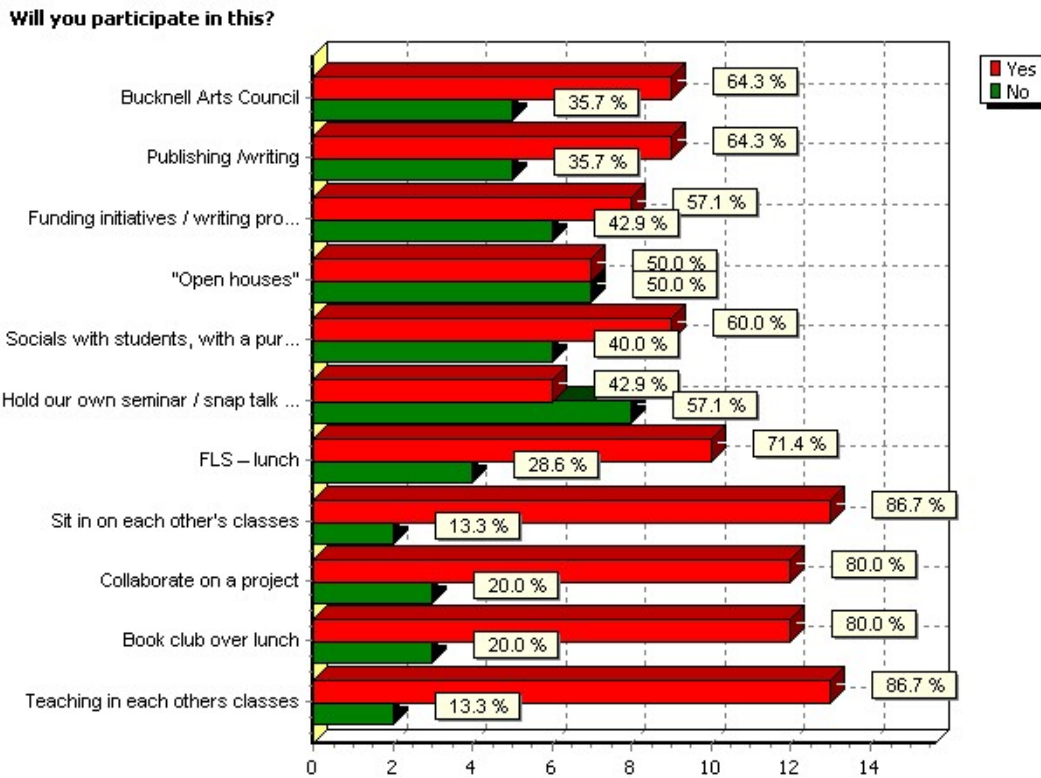


Figure 4: Interest in Participating in Faculty Engagement Initiatives

Strategies for civic engagement saw the least support as shown in Figure 5. There were a few that thought these activities were very important to BIG, while others were neutral. Offers for participation with different engagement opportunities were low at 21 percent. Some participants commented that they didn't understand what these activities are or how they could be involved with such organizations as the Keystone Innovation Zone or the Small Business Development Center. (both are state-supported economic development organizations). Many faculty are engaged in service activities with the community. There appeared to be confusion of how they could engage in activities with innovation. There is also a greater sense of need to work on activities within the university before extending outward. This is an area for exploration in the future.

Will you participate in this?

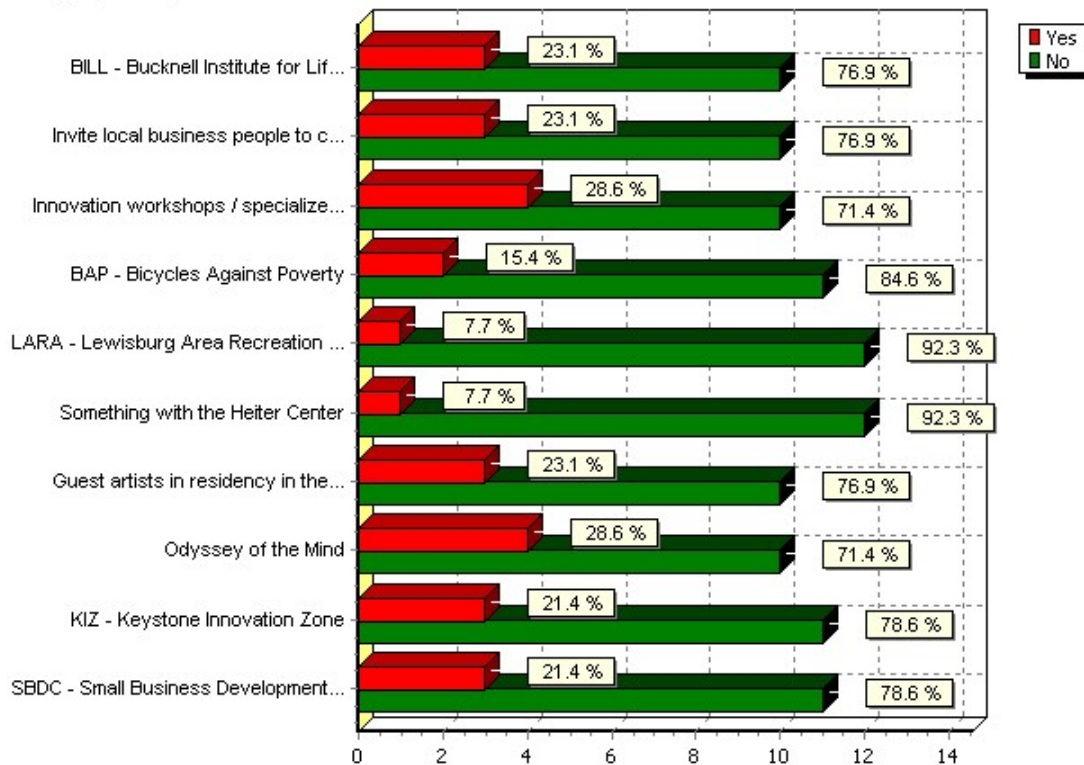


Figure 5: Interest in Participating in Civic Engagement Initiatives

Organization and Resource Identification

Participants in the workshops recognized the greatest impediment to progress is lack of time. All of the faculty have an interest in developing the university innovation ecosystem, but recognize the challenges in doing so on top of or in competition with other activities. One clearly identified need was for release time. There was a strong interest in establishing endowed professorships in innovation that would be distributed across disciplines. These professorships would have release time and financial resources. They would be appointed for terms and then become available to others. There was also a strong interest in a pool of student assistantships available. Such assistance would be helpful in developing class exercises or on short-term innovation projects.

As mentioned above, as part of the workshops, the faculty studied organizations at other universities on innovation and entrepreneurship as well as other “special-purpose” organizations within the university. Based on finding of this research, there was considerable resistance to establishing a formal organizational structure such as a center, at least early on. Many felt that organizational structures could threaten the nimbleness and flexibility to respond to opportunities despite the benefit of administrative support.

There was strong support for establishing a “hatchery” environment for students to gather and explore ideas of innovation. This hatchery could be tied to special-purpose housing. It would include meeting spaces equipped with materials and supplies to support

creative endeavors with modeling and prototyping/testing. The hatchery would provide an environment that fostered the proclivities of like-minded students to explore innovative activities.

Future Steps

The Bucknell Innovation Group has moved forward on several initiatives. Faculty plan to incorporate exercises and modules on innovation in their spring 2011 classes. A new course called *Impact: Exploring Innovation Across the Disciplines* will be team-taught in spring 2011 to students in engineering, arts and sciences. This class has a professor from engineering and from management as the leads, but it also includes faculty from art, theater and dance, music, English and classics who will give guest lectures and support projects.

BIG will form teams to move forward on initiatives of identified interest from the questionnaire. A focus will be placed on curricular and co-curricular development and faculty engagement. BIG is scheduled to present plans in the university Faculty Learning Series to engage others at the university. A team is also working with the university development office to explore potential gift opportunities. BIG has also reviewed the recent book from Feters et al. (2010)⁶ that provides insights to building an effective university entrepreneurship ecosystem and is also exploring how to incorporate those ideas.

Conclusion

Bucknell University is on the path to uniting its innovation and entrepreneurship ecosystem. A series of workshops has resulted in the formation of the Bucknell Innovation Group comprised of faculty in engineering and the liberal arts. In establishing this collaboration considerable care was given to acknowledge cultural and philosophical differences. BIG also identified other key elements that will be essential to success and has taken steps to develop those. Foremost, it has been important to create a mission statement to establish identity and clarify the goals of the group. In formulating the mission statement, BIG also established a definition of innovation that all supported. This statement will be useful for expanding the reach of the group to new faculty and potential funding sources. The group also garnered support from university administrators and stakeholders. This support is not only financial. Administrators from the president's office, office of development, and deans' offices, in addition to the Small Business Development Center, have met repeatedly with the group to provide assistance.

BIG has established a list of initiatives for teams to explore. They acknowledged the importance in doing fewer things, and doing them well. The greatest faculty interest is in curricular development and faculty development. In response, members have established curricular initiatives ranging from development of course assignments on innovation within existing courses, to guest lectures. Most ambitious is development of a new interdisciplinary team-taught course on *Exploring Innovation Across the Disciplines*. BIG has also recognized the importance of maintaining momentum by continued

engagement with the group. They have planned additional meetings and social opportunities. They have linked activities with the universities national speaker forum Bucknell Beyond the Box that include meals with the speakers and reading groups. Members of BIG also have scheduled presentations in venues to other faculty such as the Faculty Learning Series.

Members of BIG have also moved forward to gain financial support. Two proposals have been written. A grant has been awarded from the Pennsylvania Keystone Innovation Zone to engage faculty and students in potential projects with local companies. A description for interdisciplinary endowed Professorships in Innovation has been created to help the Office of Development seek benefactors. Perhaps the greatest benefit has arisen from the collaboration among BIG members. Multiple emails are exchanged weekly to/from BIG people identifying articles or books to read, events to attend, and information about other universities. The key now is to keep the momentum.

References

1. Aulet, W. (2008), "How to Build a Successful Innovation Ecosystem: Educate, Network, and Celebrate," Xconomy.com, October 14.
2. Peterson, T.W. (2009), "Creating an Innovation Ecosystem", NSF Publication, <http://www.nsf.gov/attachments/115706/public/Innovation.pdf>.
3. Snow, C. P. (1960). *The Two Cultures*. Cambridge: University Press
4. Sayre, Wallace Stanley (1973) quoted in the *Wall Street Journal*, December 20th.
5. Roam, D. (2009), *The Back of the Napkin: Solving Problems and Selling Ideas with Pictures*, Penguin Publishing, London, UK.
6. Fetters, M.L., Greene, P.G., Rice, M.P., Butler, J.S. (2010), *The Development of University-based Entrepreneurship Ecosystems: Global Practices*, Edward Elgar Publishers.

Appendix A

Workshop on Exploring a University-Wide Innovation Ecosystem

August 9th and 10th 2010

Monday 8:30 a.m. to Noon

1. Introductory remarks by Steve Shooter on his understanding of the concept of innovation.

Each participant displays the result of his/her assignment prepared before coming to the workshop. The assignment is to prepare a five-minute presentation of a vivid example of personal impact, making it concrete by conveying it with a story, image/picture, object, etc

2. Workshop participants offer their impressions of how they would link to an innovation ecosystem. A preliminary university-wide ecosystem map containing possible elements of an innovation ecosystem is displayed--eliciting comments and exploring pieces that are missing or unintentionally omitted.

3. Breakouts in which groups come up with **opportunities** and **challenges** to formulating a united innovation ecosystem

- Each group has flip charts, pens, etc. to use when reporting their findings to the rest of the group
- An academic assistant captures the output of this SWOT analysis in powerpoint slides for use during afternoon session

Lunch Provided

Monday 1:00 p.m. to 3:00 p.m.

1. Administrators are encouraged to make introductory remarks and offer personal insights and views of how innovation fits into the broader University strategy.

2. Presentation of morning SWOT analysis for administrators' reactions and reflections.

3. Record administrators' reactions to SWOT

4. Administrators offer preliminary reflections on possible sources of support, with the expectation that there will be a formal follow up to the group by XXX date.

3:00-4:00 Faculty debrief

At end of day one, distribute a homework assignment that involves benchmarking the following innovation-related programs at other universities:

<http://dschool.stanford.edu/>

<http://www.lehigh.edu/~inideas/index.html>

<http://new.oberlin.edu/office/creativity/index.dot>

<http://entrepreneurship.wfu.edu/>

When exploring these programs take note of things that really excite you and things that really turn you off.

Tuesday 8:30 a.m. to noon

I. Drawing inspiration and learning from other programs

Participants contribute results of homework assignment: What features of other programs really excited you? Why? What really turned you off? Why?

II Where do we want to go?

Form new breakout teams that address some of the following questions:

What do we want the innovation ecosystem to stand for? What should its identity be? What is the proper name and key terminology to convey an image that resonates and is inclusive?

What kinds of students do we want to be involved in the innovation ecosystem?

What can the innovation ecosystem do for our students?

What does success look like—one year out; three years out; five years out?

III Critical Success Factors for Getting There

Breakout groups consider the following questions:

What does the organizational structure for innovation ecosystem look like?

What cultural changes are needed?

What types of funding are needed?

What people are needed?

What infrastructure is needed?

What release time is needed and for whom?

What administrative support is needed (leadership, commitment, clerical, etc.)?

What physical presence is desirable?

Finally, what are the most pressing challenges to particular success factors?

Tuesday 1:00-3:30 p.m.

This session will focus on the proposed interdisciplinary course on innovation offered during the spring 2011 semester.

1. Breakout groups propose possible learning goals for the course—examples of lecture topics, etc.
2. Group discussion of how individual workshop participants might contribute to course—teaching an individual session, team-taught session, advisory roles for student teams, etc.

Discussions about other collaborations and how the Bucknell Innovation Group can support them in their endeavors

3:30-4:30

1. **Wrap-up**-- Overall discussion of main outcomes of workshop and critical next steps to move the ecosystem forward—date for follow-up meeting scheduled; details for drafting of preliminary strategic plan; possible homework assignments to be completed before next group meeting, formation of action groups to focus on preliminary initiatives.