

Benchmarking the Innovations Capstone Course at Oklahoma State University: Lessons learned and changes made

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Abstract

Beginning January 2010, through April 2010, an evaluation was conducted regarding the Innovations Process course at Oklahoma State University. This evaluation was conducted as a way to provide participant feedback to the Innovations Process faculty in order to benchmark the course. As a unique course funded by a USDA Higher Education Challenge grant this project allowed the faculty of the interdisciplinary course to reflect on the first year of the project and use feedback from the students of that year to make changes for future years.

Student participants in the Innovations Process course are placed in interdisciplinary teams and challenged to solve a real-world problem in partnership with a local (Oklahoma) sponsor company. The participants combine engineering, business and communications skills to develop a prototype, budget analysis and a comprehensive communications plan with their sponsor company.

The objectives of the Innovations Process, as stated by the grant proposal, are to create workplace-ready graduates who are capable of participating in and eventually leading private sector innovation; enhance the education experience of participants in agribusiness, engineering and communications in an effort to increase enrollment in those areas; and develop and disseminate interdisciplinary curricula for adaptation and use by other universities. This report addresses three main research questions, the research methods used, findings and recommendations.

The course seems to be of benefit to its participants, even just one year after completion. The majority of former Innovations Process participants reported they were “likely” or “very likely” (see Table 2) to mention their experiences in the course in a job interview or with colleagues. However, the response wasn’t quite as positive when asked, “How beneficial was the course to your job search?”

Also, the former participants tended to raise significant concerns about the course. For example, some felt that their opportunities for learning major-specific details suffered because of the course. The former participants tended to report that time spent in class was not as useful as time

spent working with their team on their projects. This may be a reflection of feeling overwhelmed by the number of professors regularly involved in each class period.

Introduction

The Innovation Process course is a two-year pilot program funded through a \$465,595 United States Department of Agriculture Challenge Grant. The course, which finished its second year during the 2009-2010 academic year, is comprised of teams of student participants from the following disciplines:

- Agricultural economics;
- Biosystems and agricultural engineering;
- Agricultural communications; and
- Mechanical and aerospace engineering.

The student teams are challenged to solve a real-world problem for a local (Oklahoma) client company, generally from the agricultural industry. Three universities, including Oklahoma State University, the University of Nebraska-Lincoln, and California Polytechnic State University – San Louis Obispo, share in the grant.

However, this benchmark study is limited to Oklahoma State University's role in the program. Oklahoma State University required the 31 participants enrolled in the pilot program to complete a three-semester sequence of classes, during which they collectively completed five interdisciplinary projects for clients. Two of those projects, including an arena drag and a pet bed, are now in production. The program is required for senior engineering participants, but is only recommended for participants from the other disciplines. Students who participated in this evaluation were able to earn seven credit hours toward their bachelor's degree at OSU.

The objectives of The Innovation Process include:

- Creating workplace-ready graduates capable of participating in and eventually leading private sector innovation;
- Enhancing the education experience of participants in agribusiness, engineering and communications in an effort to increase enrollment in those areas; and
- Developing and disseminating interdisciplinary curricula for adaptation and use by other universities.

Additionally, the program is an important component related to retaining Oklahoma State University's accreditation through the Accreditation Board for Engineering Technology. In addition to requirements that engineering participants be able to apply their knowledge of math, science and design skills, ABET, Inc., also requires participants be able to work in interdisciplinary settings and "communicate effectively" (p. 3).

This formative survey is limited to the experiences of the program's first-year participants, and does not take into account any changes or improvements made since those participants completed the course. Also, this evaluation does not cover all aspects of The Innovations Process course, including the involvement of other universities and the partnering client companies.

Logic Model Framework

In the interest of clearly defining what was expected from this paper, the authors developed the following logic model for the Innovations Process program (see Figure 1). Logic models are commonly used to help deliver a “long-term vision of how program participants will be better off (changed) because of the program” (Fitzpatrick, Sanders, and Worthen, 2004, p. 79).

This logic model works to identify and correlate the inputs, outputs, activities, and outcomes with the goals of the Innovation Process program.

Inputs (treatment):

The following investments of the Innovations Process were identified:

- Six full-time faculty members are charged with identifying, verifying, and selecting appropriate client companies to work with student teams;
- Faculty is also charged with curriculum development, coordination of lectures, grading, proof-reading student-team reports, and serving as team advisors;
- Graduate research assistant is charged with compiling, organizing and analyzing pre-, mid- and post-experience survey data, in addition to providing support for faculty presentations and papers;
- Classroom facilities and Biosystems and Agricultural Engineering technicians, laboratories and equipment are provided for use by student teams;
- OSU Food and Agricultural Products Center technicians, laboratories and equipment are provided for use by student teams; and
- OSU New Product Development Center funds have also been provided for the program’s use.

Outputs:

The following **activities** the Innovations Process supports were identified:

- Faculty advisement of student teams, including work as project manager;
- Faculty attendance of conferences;
- Faculty coordination of communication with clients, suppliers and regulatory agencies;
- Faculty/student travel to client companies and partnering universities; Coordination of three class periods per week, plus additional time spent in laboratory settings;
- Engineering participants are required to develop and deliver a product;
- Agricultural economics participants are required to develop and deliver a budget analysis; and
- Agricultural communications participants are required to develop and deliver a marketing plan and promotional materials.

The following **participants** of the Innovations Process were identified:

- Six full-time faculty members;
- One graduate research assistant;
- Approximately 40 participants per year;
- Approximately five client companies;

- Laboratory technicians; and
- Additional faculty/guest speakers.

Outcome (impact):

The following short, long-term and medium-term goals were identified:

- **Short term:** The short-term goals of the Innovations Process program include the education of participants about interdisciplinary teamwork; nuts and bolts of the various business, design and communications work required for a single project; and a the production of a final market-ready product, including business and marketing plans and materials, for participants' partnering client.
- **Medium term:** The medium-term goals of the Innovations Process program include the increased capacity of local companies to work with the university; the encouragement of local companies to adopt innovative practices; and the increased ability of companies to take a student-produced idea or product directly to market.
- **Long term:** The long-term goals of the Innovations Process program are two fold. First, they include the institutionalization of the program as a regular part of Oklahoma State University's recognized curriculum; and the expectation that every student will complete a capstone project that requires them to solve a real-world problem. Additionally, long-term goals for local industry include the development of a healthier and more prosperous local economy; and job creation at firms with innovative experience.

Intervening mechanisms:

The following external factors that may influence the Innovations Process program were identified:

- Client company may fail, become unresponsive, quit the program, or change project plans;
- Safety standards of client companies must be verified;
- Industry competition;
- Economic conditions may impact the client company; and
- Participants may quit the program/school.

Generalizations:

- The following assumptions were made about the Innovations Process:
- Participants will attend and participate in class and team meetings;
- Participants will take the program seriously;
- Instructors will be prepared for class periods;
- Instructors will be prepared to handle a variety of external factors that could impact participants' success as a team; and
- Instructors and participants can expect teams to have turmoil, but that experience is part of the educational experience.

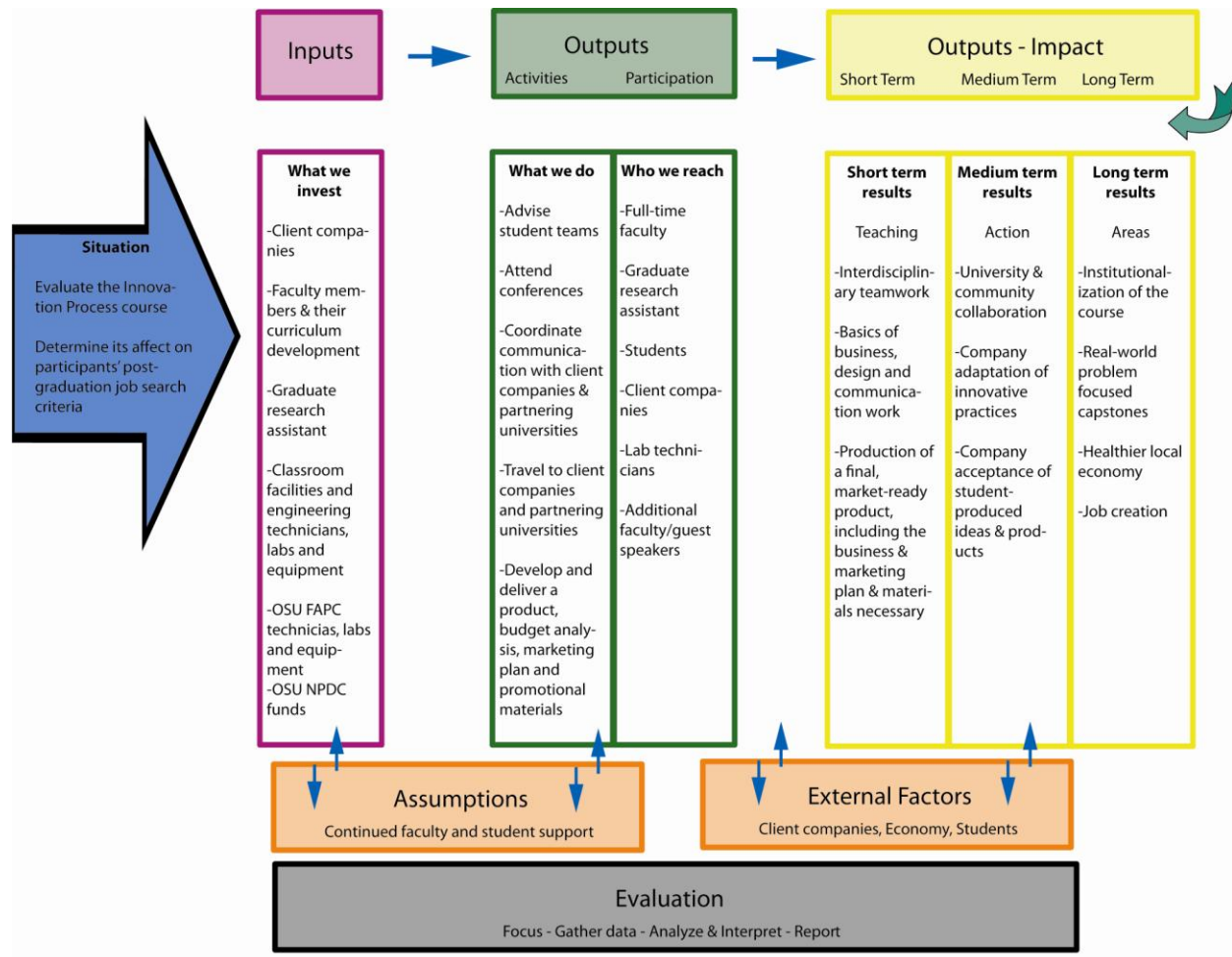
Conclusions:

The Program Action logic model is appropriate for use in this project as it provides clear and concise direction for short-, medium- and long-term goal planning. The following

diagram illustrates those goals, as well as inputs, outputs, outcomes, assumptions and external factors.

The figure is designed to provide a common agreement among the evaluators and stakeholders about the current state of the Innovations Process and its future direction.

Figure 1: Program Action Logic Model



Research Questions

The purpose of the study was to provide insight to the following three evaluation questions:

This evaluation answered three main research questions.

- How the OSU Innovations Process course influenced participants' job search or continuing education decisions;
- How the OSU Innovations Process course influenced participants' ability to work in an interdisciplinary environment; and
- What were the perceptions of participants toward the course itself?

Methodology

Former, first-year program participants (N=30) had been asked to provide contact information before completion of the course in May 2009. The participants had been asked to voluntarily provide their name, number, physical address and e-mail address for a potential follow-up survey. All participants provided at least an e-mail address, which proved to be the best method of contact. Since the participants would be contacted via e-mail, conducting a short online survey seemed the most feasible choice, with the promise of producing the highest response rate. A link to the survey (<http://www.surveymonkey.com/s/B9YQ86S>) was included in an e-mail to participants on April 5, 2010. The survey was available for completion online until April 19, 2010. During this two-week period, 11 of 30 contacted former participants responded to the survey.

The survey instrument consisted of 16 questions, constructed as follows:

- three required a multiple choice answer;
- nine required a multiple choice answer and an optional short answer response; and
- four required a short answer response only.

The survey used a mixed-method design. Six survey questions featured a Likert-type scale to allow for the collection of quantitative data. Additionally, most questions provided opportunities to collect qualitative data. The researchers wanted to give former participants every opportunity to provide their own perspectives, including those that may not have been presented on the survey. The evaluation's three research questions could be sufficiently answered with quantitatively derived answers. However, the mixed-method allowed for answers to the research questions while also shedding light on exactly how many respondents believed a certain way about various aspects of the program. Additionally, the client seemed interested in learning of former participants' experiences and thoughts about the program through those participants' own words.

The population for this evaluation includes participants who completed the Innovations Process course in May 2009. The majority of these participants are graduates of Oklahoma State University.

The sample includes the following breakdown of participants by major:

- four agricultural communications participants;
- three agricultural economics participants;
- four biosystems and agricultural engineering participants; and
- one mechanical and aerospace engineering participant.

Of the 11 former participants who responded to the survey instrument, six are currently pursuing graduate degrees; five are working in a field related to their major; and one is working in a field unrelated to their major (multiple selections were allowed). The constraints of the evaluation included were not acquiring as much qualitative data as possible, because short answers were not required of all questions. A large number of short answer questions could have deterred many participants from completing the survey.

Findings

This section includes the quantitative and qualitative data gathered through the actual survey questions as answered by former students who have completed The Innovations Process course. The survey questions are presented in order of relevance to the evaluation's three main research questions.

The study was conducted via a 16-question online survey through SurveyMonkey.com, a website that aides in survey development, response collection, and analysis. A link to the survey was e-mailed to the 30 former Oklahoma State University Innovations Process participants who left contact information for this purpose prior to completing the class. Eleven participants, or 35 percent of those contacted, responded to the survey.

Research Question 1: How did the OSU Innovations Process course influence participants' job search or continuing education decisions?

Table 1: *Demographics of former Innovations Process respondents (N=11)*

Questions	Frequency (f)	Percentage
1. What was your major at Oklahoma State University?		
• Agricultural Communications	4	36.4
• Agricultural Economics	3	27.3
• Biosystems and Agricultural Engineering	4	36.4
• Mechanical and Aerospace Engineering	1	9.1
• Other	0	0.0
Total	11	100
2. Are you currently		
• Working in a field related to your major	5	45.5
• Working in a field unrelated to your major	1	9.1
• Pursuing a graduate degree	6	54.5
• Unemployed	0	0
Total	11	100
3. How long have you worked in your current job?		
• 0-3 months	1	9.1
• 4-6 months	1	9.1
• 7-10 months	3	27.3
• 11-12 months	2	18.2
• Not applicable	4	36.4
Total	11	100

According to the survey findings, the majority of participants who responded, six participants, or 54.5 percent, are pursuing a graduate degree (see Table 1). Also, five participants, or 45.5 percent, reported working in a field related to their major.

Not surprisingly, as the majority of respondents are pursuing a graduate degree, four former students, or 36.4 percent, reported that the question "How long have you worked in your current job" was not applicable to them. However, five respondents, or 45.5 percent, reported working in their current job for at least the past seven to 12 months.

Table 2: *The Innovations Process survey questions related to job searching (N=11)*

Question	Frequency (f)	Percentage
4. How likely are you to mention the Innovations course in a job interview or with colleagues?		
• Not at all	0	0.0
• Unlikely	1	9.1
• Likely	5	45.5
• Very likely	5	45.5
Rating average		3.36
Total	11	100
5. Was the course beneficial to your job search?		
• Not beneficial	1	9.1
• Somewhat beneficial	5	45.5
• Beneficial	2	18.2
• Very beneficial	3	27.3
Rating average		2.64
Total	11	100

According to the survey findings, 10 respondents, or 91 percent, reported that they were “likely” or “very likely” to mention the Innovations course during a job interview or with colleagues (see Table 2). Several respondents chose to write additional responses related to the questions in a provided text box labeled “please explain.”

In response to Question 4, many participants highlighted aspects of the program that they would or have mentioned to a potential employer or a colleague.

Consider the following written responses to Question 4:

- “I am likely to mention the Innovations course in a job interview because it was a very unique experience. I think potential employers will appreciate my experience in working with interdisciplinary groups.”
- “It shows interdisciplinary teamwork, and highlights skills gained from working with a real company.”
- “I felt like this innovations class gave me good problem solving skills. I’ve written about it in papers for school and it has been discussed in regular conversation.”

Respondents were somewhat split on whether the course was beneficial to their job search (see Table 2). Five respondents, or 45.5 percent, reported that the course was “beneficial” or “very beneficial” to their job search. However, five respondents, or 45.5 percent, also reported that the course was “somewhat beneficial.” One respondent, or 9.1 percent, reported that the course was not beneficial. In written responses, the four of the five respondents who provided comments noted that they were either in graduate school and had not begun a job search or that the course was not applicable to their job.

Consider the following written responses to Question 5:

- “It was a good point to bring up in interviews about my teamwork skills. It just wasn’t particularly applicable to my job.”

- “Employers / Interviewers enjoyed hearing about the course especially since it addresses the popular trends.”
- “I haven't job searched yet. I think it gave good experience with working in groups. I hope that helps because I hope to get a job with a team environment.”

Research Question 2: How did the OSU Innovations Process course influence participants' ability to work in an interdisciplinary environment?

Table 3: *The Innovations Process survey questions related to current interdisciplinary activities (N=11)*

Questions	Frequency (f)	Percentage
6. Do you currently work or study		
• As part of a team	8	72.7
• Independently	3	27.3
Total	11	100
7. If you work in a team, are your team members from a variety of disciplines?		
• Yes	2	18.2
• No	7	36.6
• Not applicable	2	18.2
Total	11	100
8. How well did this course prepare you to work as part of an interdisciplinary or cross-functional team?		
• Not at all	0	0.0
• Somewhat	6	54.5
• Very well	4	36.4
• N/A	1	9.1
Rating Average		2.4
Total	11	100

According to survey findings, eight respondents, or 72.7 percent, reported that they currently work or study as part of a team (see Table 3). However, three respondents, or 27.3 percent, reported that they currently work or study independently. Written responses demonstrated that some participants may have been conflicted on whether to consider themselves team members or independent workers.

Consider the following written responses to Question 6:

- “There is some teamwork involved, but most of my work is completed independently.”
- “I work with a small group but most projects are done independently.”
- “I've done several projects this year with one other student, but it's been a different person each time.”

Additionally, the majority of respondents reported that their team members were not from a variety of disciplines (see Table 3). This may be an area in which advisors could further explain exactly what constitutes an interdisciplinary setting or how the interdisciplinary experience is relevant even when team members have similar jobs.

Consider the following written responses to Question 7:

- “Some of our training varies, but we all do basically the same job.”

Also, respondents seemed split on whether the course prepared them to work as part of an interdisciplinary or cross-functional team (see Table 3). Six respondents, or 54.5 percent, reported that the course prepared them “somewhat,” while four, or 36.4 percent, reported that the course prepared them “very well.”

Consider the following written responses to Question 8:

- “I say 'somewhat' because my team really did not encounter any problems that we needed extra effort to work through.”
- “Our particular project was very research based, so our engineering participants didn't get a chance to really use their skills (sic).”
- “You had to depend on others, and learned about the whole process of developing a product instead of just the part we would normally do.”

Table 5: The Innovations Process survey questions related to capstone preference (N=11)

Question	Frequency (f)	Percentage
11. Looking back, would you have preferred an interdisciplinary or single-disciplinary senior design or capstone course?		
• Interdisciplinary	9	81.8
• Single-disciplinary	2	18.2
Total	11	100

Respondents overwhelmingly agreed that they prefer an interdisciplinary capstone or senior design course (see Table 5). According to survey findings, nine respondents, or 81.8 percent, reported that they would prefer an interdisciplinary course. However, interesting perspectives appeared in their written responses.

Consider the following written responses to Question 11:

- “I feel like I learned how people in other disciplines think differently from mine. It also made me realize that no single discipline is better than the other and they have to work together for the innovation to be a success.”
- “Although I feel the experience was good, I do not believe I was able to improve upon my communications/marketing skills. Instead, I learned a great deal about engineering.”

The respondents’ preference for participating in an interdisciplinary senior design or capstone course may have interesting implications for the future of such projects, especially as the Accreditation Board for Engineering and Technology requires engineering students be able to “to function on interdisciplinary teams” (p. 3).

Research Question 3: The perceptions of participants toward the course itself.

Table 4: *The Innovations Process survey questions related to future participants (N=11)*

Question	Frequency (f)	Percentage
9. Would you recommend this course to future students?		
• Not at all	0	0.0
• Unlikely	0	0.0
• Likely	6	54.5
• Absolutely	5	45.5
Rating average		3.45
Total	11	100

According to the survey findings, 11 respondents, or 100 percent, reported that they were “likely” to or would “absolutely” recommend the course to future students (see Table 4).

Consider the following written responses to Question 9:

- “I thought it was a great experience. I felt like it gave me an opportunity to work with people who are different from me. I felt like we had a great insight to problem solving. I also witnessed how different teams interacted and how some teams worked better together than others.”
- “I would recommend this course if a lot of the ‘kinks’ have been worked out.”

Table 6: *The Innovations Process survey questions related to course rating (N=11)*

Question	Frequency (f)	Percentage
12. Looking back to when you were a student in this course, how would you have rated it?		
• Total waste of time	2	18.2
• Useful	7	63.6
• Very useful	2	18.2
Rating average		2.00
Total	11	100
13. Today, one year after completing the course, how would you rate it?		
• Total waste of time	0	0.0
• Useful	6	54.5
• Very useful	5	45.5
Rating average		2.45
Total	11	100

Two questions related to the course rating were geared toward understanding how the perspectives of the class’ usefulness changed, if at all, in the year after completing the course (see Table 6).

According to the survey findings, two respondents, or 18.2 percent, reported thinking that the course was “very useful” during their time as a student participant. However, that number grew to five respondents, or 45.5 percent, in the year after completing the course. Additionally, two

respondents, or 18.2 percent, reported thinking that the course was a “total waste of time” during their time as a student participant. However, that number fell to zero in the year post-course completion.

Consider the following written responses related to Question 12:

- “Some days were a waste but for the most part was useful. The majority of the learning was when we were out of class working together as a team.”
- “It gained me contacts in an ag field I hadn't previously thought of as a job area.”
- “I do not believe I contributed much to the project. Our project did not require much in the form of marketing materials or other communications pieces. Most of the semester was spent learning very technical engineering concepts rather than using my communications skills. I saw it as an engineering senior design project with business and communications people thrown in, not really making an impact on the group.”

Additionally, consider the following responses related to Question 13:

- “I have not had an opportunity to really practice what I learned.”
- “It looked great on my résumé and in interviews. I learned some about working on a team long-term.”
- “I think I got some great experience working with other disciplines, however, I do not use that in my current job. I would have liked to have been able to focus more on my skills/major.”

The following four questions were purely qualitative-based, open-ended response. The responses to these questions were categorized according to subject.

Table 7: *The Innovations Process survey Question No. 10 “Please provide an example of how this course impacts your career.” (N=11)*

	Does not relate
	<ul style="list-style-type: none"> • “N/A” • “It hasn't directly impacted my career, but I was able to help a co-worker get started on a new business.” • “It does not relate to my career.”
Provides different perspective	<ul style="list-style-type: none"> • “Just helps me understand that the people that will be my team member will not always be positive, and therefore, I should talk it as if I'm the only member of the team.” • “It makes you look at things differently.” • “The ability to see others points of view and be better suited to working with those individuals.”
Real-world experience	<ul style="list-style-type: none"> • “Just experience working with different thought processes before it was required in industry.” • “Really not sure. But is a good buffer form (sic) class to a career. You don't just get tossed in the shark tank all at once.” • “My particular experience in the course required months of research for topics that would ultimately be denied, and in my current position a similar process exists.” • “I gained marketing experience that I would not have had otherwise.” • “Helped in the interview process as an example of a time when I worked on a team.”

According to the survey findings, most respondents' written comments referenced the real-world experience they gained when asked how the course affected their career (see Table 7). However, a few seemed to focus on how the course made them appreciate diverse perspectives.

Table 8: *The Innovations Process survey Question No. 14 “What about the course did you find most helpful?”*
(N=11)

Working with other disciplines	
•	“Working interdisciplinary”
•	“Working with students and professors from varied disciplines.”
•	“Working with other disciplines”
•	“Working with other majors.”
•	“Working with students who were experienced in other areas of study.”
•	“Having people who liked to do one part or another instead of someone who hates doing that part having to do it, for example writing.”
Soft skills	
•	“better team member, thinking out side the box, learning to deal with team members in general (sic)”
•	“Learning long-term teamwork.”
•	“Learning patience and persistence.”
•	“The opportunity to work with people who didn't always get along with me.”
Real-world experience	
•	“being paired with a real business (sic)”

According to the survey findings, most respondents’ written comments regarding the aspect of the class they found most helpful referenced the course’s interdisciplinary format (see Table 8). However, many respondents also referenced soft skills important to the workplace, including patience and learning to work among various personalities.

Table 9: *The Innovations Process Survey Question No. 15 “What about the course did you find least helpful?”*
(N=11)

Time management	
•	“time frame was too short for the project we had”
•	“The actual time spent in the class room. Especially in the third semester.”
•	“Regular class attendance was unnecessary. Our time would have been better spent working on the project. The professors were often unprepared and nothing was accomplished during the time.”
•	“Class time which at times lacked direction. This time could have better been used to work with teams.”
•	“the weekly progress reports.”
Missed learning opportunities	
•	“Felt I missed a lot of learning in my specific degree area.”
•	“The content”
•	“Only meeting with campaigns class once a week.”
•	“what (sic) we worked on, was agricultural. I’m currently working in the oil and gas industry.”
Unorganized professors	
•	“All of the professors, made the course somewhat unorganized”
•	“So many professors competing for time and attention of the students.”

According to the survey findings, respondents found time management-related issues, including class attendance and weekly progress reports, least helpful (see Table 9). However, although time management-related issues were reported among the least helpful for participants, Page and Donelan (2003) in their guidelines for improving teamwork skills, recommend requiring progress reports in an effort to keep participants on-track and reinforce teamwork skills. Also, according to respondents’ written comments, many seemed to believe that additional hands-on time

working on their project would have been more beneficial than the classroom setting. Some participants felt that opportunities to learn major-specific information suffered. Two respondents reported that the number of professors involved in the course was least helpful.

Table 10: *Innovations Process Survey Question No. 16 “Please use this space to tell us anything else you would like us to know about the course.” (N=6)*

Experience	<ul style="list-style-type: none"> • “I feel this is a great course. One of the best I have had at OSU.” • “I think it is a great concept and I am glad I participated. However, I do believe I would have had a better experience and learned more in a single discipline class.” • “I think it was worthwhile.” • “Overall I enjoyed and found the Innovations experience to be a very good experience.”
Construction	<ul style="list-style-type: none"> • “I feel like we should meet with our disciplines twice a week and together once a week. I felt like I missed out on campaigns class. We met only once a week. Often the regular campaigns students met in their groups and gave a report on where they were. The innovation students weren’t to that point yet, so we just sat there. I really enjoyed the class and I hope that it continues, possibly a required course.” • “Need far fewer professors at once. Need same person giving assignments and grading so we know what to expect.”

Former participants were not required to answer Question No. 16, final question on the Innovations Process survey. It was meant as a catch-all category that allowed participants to share additional thoughts not addressed in the survey.

According to the survey findings, respondents enjoyed the Innovations course, although some had reservations (see Table 10). Some respondents reported that they felt left behind, as compared to their peers participating in single-discipline senior capstone courses, such as the Campaigns course. Additionally, some stated that reporting to several professors at once was confusing.

Discussion

The Innovations Process Course is a unique concept that offers a real-world education to its participants. According to participants the course was of benefit to its participants, even just one year after completion. Former participants reported that they do not regret taking the course, and, in fact, are likely to recommend others take it; a response that bodes well for the program’s goal of increasing enrollment. However, they did note some areas where the course could be improved.

The majority of former Innovations Process respondents reported they were “likely” or “very likely” (see Table 2) to mention their experiences in the course in a job interview or with colleagues. However, the response was not quite as positive when asked “How beneficial was the course to your job search?” For that question, five of the respondents reported that the course was only “somewhat beneficial,” a surprising response considering how likely the respondents reported they were to bring up the course with a potential employer. Faculty plan to further collaborate with past participants to determine ways to maximize the post-graduation benefits of this course, in order to provide participants with the most job-readiness possible. In addition before completing the course, participants should spend some time learning how to describe the

benefits of the course to potential employers, graduate school advisors, or colleagues. This issue was addressed in one class period during the 2009-2010 academic year, however students requested additional information regarding how to “sell” the experience.

Additionally, the bulk of the participants reported that they work as part of a team (see Table 3). However, they were less likely to identify the team as being interdisciplinary. Yet, given that the respondents tended to report working in a single-discipline team environment, the majority of them still favored an interdisciplinary senior-design or capstone course (see Table 5). Also, the interdisciplinary aspect was a major factor when participants were asked “What about the course did you find most helpful?”

Although the former participants tended to recognize the importance of interdisciplinary learning, they may be unable to recognize it in the workplace, where they may work in teams with others in their own discipline. Participants should receive instruction on how to use their interdisciplinary experience to benefit of any team experience, even those with teammates in related disciplines. Page and Donelan (2003) suggested instructors begin team projects by explaining to participants “why teamwork skills will be important in their professional business careers” (p. 125) and, further, “...the instructor should provide specific examples of job situations that require teamwork” (p. 125).

Other concerns included some students reporting that their opportunities for learning major-specific details suffered because of the course. In other words, they seemed to believe that students who completed a single-discipline senior design or capstone project received more in-depth information related to their field of study. Also, respondents reported that time spent in class was not as useful as time spent working with their team on their projects. Efforts were extended during the 2009-2010 academic year to make class time minimal and productive in order to give participants the maximum amount of time to work with their team. Fellers (1996) noted that students may find it easier to learn from their peers, and in order to facilitate this learning “...instructors will have to give up some of their lecture time to enable students to learn from one another” (p. 46). As often as possible class time takes place in a laboratory setting, giving students more chances to present their work-in-progress to the entire class. That way, all students benefit from each team’s challenges and learning opportunities. For example, some former participants said that they missed not being able to spend time working with others in the field. By having the engineers present their work, for example, those students would be better able to gain and learn from the perspectives of other engineers in the class. No matter, faculty deems class time more valuable than students in general and a balance will continue to be sought.

Students also reported feeling overwhelmed by the number of professors regularly involved in each class period. One student reported feeling that professors were “competing for time and attention of the students.” This issue was addressed during the 2009-2010 academic year as only four of the six faculty committed classroom time to the course. This seems to have eased this frustration some, however given that students are accustomed to only having one faculty member in a class, multiple faculty members in one room will continue to be a unique experience for most if not all students. In addition, the faculty for this course take a true team approach tagging off of each other when appropriate and offering differing approaches to issues that emphasize the

differences in approaches with each discipline. One way to address this issue is to better explain the format of the class at the beginning of the academic year so students better know what to expect.

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Biographical Information

Angel Riggs

Ms. Riggs is a graduate research assistant and Ph. D. candidate in the Department of Agricultural Education, Communications and Leadership.

Kirby Smith

Ms. Smith is a graduate research assistant and Ph. D. candidate in the Department of Agricultural Education, Communications and Leadership.

Cindy Blackwell

Dr. Blackwell is an Associate Professor in the Department of Agricultural Education, Communications and Leadership. Her research interests include ethics in leadership and agricultural communications, as well as academic integrity and ethical issues in agricultural communications. Her other duties include serving as the Communications Director for the OSU New Product Development Center.

Paul Weckler

Dr. Weckler an Associate Professor in the Department of Biosystems and Agricultural Engineering. He is a registered, professional engineer with over twenty years experience in electromechanical system design. His responsibilities include: teaching undergraduate and graduate level courses (including the capstone senior design project courses), and conducting

interdisciplinary research and development in the area of instrumentation, sensors and smart machines.

Dan Tilley

Dr. Tilley is a Professor in the Department of Agricultural Economics and he is the Associate Director and the Marketing Director for the OSU New Product Development Center. His areas of expertise includes agribusiness management, econometrics, marketing and price analysis.

Rodney Holcomb

Dr. Holcomb is an Agricultural Economist in the Robert M. Kerr Food & Agricultural Products Center and he holds the Browning Endowed Chair in the Department of Agricultural Economics. His areas of expertise include value-added agribusiness development; agribusiness marketing and management; consumer demand analysis.

Shelly Sitton

Dr. Sitton is an Associate Professor in the Department of Agricultural Education, Communications and Leadership. Her interests include agricultural journalism and she teaches the capstone senior project for Agricultural Communications.

Ron Delahoussaye

Dr. Delahoussaye is an Adjunct Associate Professor and the Director of Undergraduate Studies in the School of Mechanical and Aerospace Engineering. His areas of teaching and research include computer aided engineering, design and manufacturing, interactive computer graphics, design optimization, finite element analysis, mechanism design and analysis, robotics, modeling and simulation of dynamic systems.

Oklahoma State University Institutional Review Board

Date: Friday, April 02, 2010
 IRB Application No AG1017
 Proposal Title: Evaluation of Innovations Process Students' Experiences One Year Post Graduation
 Reviewed and Processed as: Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 4/1/2011

Principal Investigator(s):

Angel Riggs	Kirby Smith	Cindy Blackwell
464 Ag Hall	719 N. Walnut	444 Ag Hall
Stillwater, OK 74078	Stillwater, OK 74074	Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,



Shelia Kennison, Chair
 Institutional Review Board

Dear former Innovations student,

As a former student of the Innovations Process pilot class offered at Oklahoma State University, please consider sharing your opinion about the course. Your participation will help faculty members determine the effectiveness of the course and how it may be improved for future students. The survey "Evaluation of Innovations Process students' experiences one year post graduation" will be available online between April 5 and April 12.

The linked survey includes 15 questions designed to gauge your experiences in the course and thoughts about its future. The survey is voluntary and results are anonymous. No sensitive information will be asked and the risks associated with this study are minimal. It is estimated that the survey will take 10 to 15 minutes to complete. By clicking on the link below, you are giving your consent to participate in the survey. Results of the survey will be stored on a password-protected OSU office computer. Any printed data will be stored in a locked file for one year.

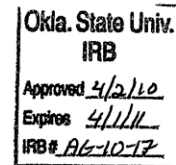
The survey was designed and will be analyzed by graduate research assistants Angel Riggs and Kirby Smith through the Program Evaluation course offered at Oklahoma State University.

For purposes of this survey, "the course" or "this course" refers to The Innovations Process (AGEC 4423; AGCM 4403, BAE 4012, MAE 4010). "Interdisciplinary" refers to the variety of majors pursued by student team members.

If you have questions about your rights as a research volunteer, you may contact the Oklahoma State University Institutional Review Board (IRB) Chair, Dr. Shelia Kennison at 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu.

For more information, contact Angel Riggs at (405) 343-2557; Kirby Smith at (405) 744-6539; or Dr. Cindy Blackwell at (405) 744-5133

Thank you for your time,
Angel Riggs and Kirby Smith



Summary of methods and findings

The evaluators developed and disseminated an online survey instrument to former participants of the Innovations Process course. The instrument collected both quantitative and qualitative data to ensure the most comprehensive understanding of the course's outcomes. Eleven of 30 contacted former participants of the course responded to the survey.

Among the evaluations' major findings:

- 10 of 11 respondents reported they were likely to mention the course in a job interview or with colleagues;
- Nine of 11 respondents reported that they would prefer an interdisciplinary or senior design capstone course, as opposed to a single-discipline experience;
- All 11 respondents reported they were "likely" or would "absolutely" recommend the course to future participants.

Summary of evaluation judgments and recommendations

Among the evaluation's major recommendations:

- Before completing the course, participants should spend some time in-class learning how to describe the benefits of the course to a potential employer, graduate school advisor, or colleagues.
- Participants should receive instruction on how to use their interdisciplinary experience to benefit of any team experience, even those with teammates in related disciplines.
- Based on the comments of former participants, participants may be overwhelmed by the number of professors involved in the course. It would be more beneficial for professors to have more clearly defined roles for the participants.

Class time should be minimal and productive in order to give participants the maximum amount of time to work with their team. Perhaps class time could take place in a laboratory setting, giving participants more chances to present their work-in-progress to the entire class.