Using Student Professional Development Planning to Inform Program Review

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ABSTRACT
Development and modification of academic programs is enhanced by incorporating input from the stakeholders of the program. This paper discusses the process used by an Information Assurance and Security (IAS) program to obtain input from students during their final year of the program. Students evaluated job advertisements and information assurance curriculum recommendations and compared their findings to the IAS program. Students provided recommendations on how to better facilitate student learning. Faculty plans on using the student work and recommendations as input to the Academic Review Process during the upcoming year.

Categories and Subject Descriptors
K.3.2 [Computer and Information Science Education]: Self-assessment.

General Terms

Keywords

1. INTRODUCTION
Traditionally programs use a variety of assessment methods to determine if the outcomes described within a program and the results of the teaching efforts are the same. These assessments include testing, labs, and homework. As differences are found a program may be adjusted to address the shortfall. Previous work has been studied to help define and improve the evaluation process [4].

When completing an academic program review or assessment, it is also helpful to obtain input from the stakeholders of the program. This includes items like general surveys conducted after students have graduated [3]. But this is only part of the information regarding a student’s perception of their education. In particular, it is helpful to obtain student input about their learning prior to leaving the program. For example, student input can be used to modify the program in an effort to increase student interest, improve student learning, and address student career goals.

Penn College requires all IAS students to enroll in IAS492A and IAS492B – IAS Seminar. IAS Seminar is a pair of 1-credit courses taken during the fall and spring semesters of the student’s last year of enrollment. IAS Seminar was designed so that faculty can assist students in making the transition from being a student to being in the workforce. Goals include exploring the job market, developing a resume, assessing their own skills and creating a professional development plan.

Students enrolled in IAS492B in spring 2012 as part of identifying the needs for respective professional development plans were assigned the task completing a program review of the current IAS program. They reviewed the current job market and Information Assurance curricular recommendations, the program’s goals and the course student learning outcomes. Once their review was complete, students compiled a collection of recommendations that can be used to assist faculty in their upcoming Academic Program Review.

This paper addresses the process of this student review (Section 2), the benefits gained by both the students and faculty (Section 3) and a conclusion (Section 4).

2. PROCESS
During their review, the students developed a collection of job skills and academic skills and combined them to obtain an expected SKILL SET. Once the skill set was developed, students compared this skill set to the IAS program goals and the student learning outcomes from required course syllabi in order to develop a gap analysis. They also determined the extent to which they are comfortable with the content of the skill set. The students used their comfort level to develop a gap analysis between the skill set and their understanding of it. Finally, the students developed a collection of recommendations that would increase student understanding and retention of the material.

As students gathered information they used a high degree of collaboration taking time to discuss and gather information in small groups and as a full class. All student work was documented
in a collection of Google Docs documents. Each student as well as all faculty teaching IAS courses had access to these documents.

2.1 Developing the Skill Set
The class started with a discussion of the importance of self-evaluation within the aspects of the jobs they were likely to hold. Faculty then spent a few classes answering questions about the process used to develop a program and to evaluate various resources appropriate to their degree. Students used this information to begin the first process and would then bring questions about documentation and evaluation back to faculty in later classes.

The task was to develop a collection of IAS skills that should be developed within an IAS program. Since our students were about to graduate from our IAS program that was based on the NSA’s NSTISSI 4011 (National Training Standard for Information Systems Security (INFOSEC) Professionals) [1] and CNSSI 4016 (National information Assurance Training Standard for Risk Analysts) [2], students were asked to develop the skill set based on these two training standards. Students were also asked to conduct a review of the current job requirements for IT positions with five years of experience. A set of common knowledge skills for current jobs were then incorporated into the documentation.

Students were split into a total of three groups for this activity. One group concentrated on finding a collection of current job advertisements and extracting the skills expected by employers. A second group evaluated NSTISSI 4011 [1] to extract a list of skills related to INFOSEC Professionals. The third group evaluated CNSSI 4016 [2] to extract a list of skills related to Risk Analysts. Each group updated the collaboration documents with the skills they determined were important under their assigned framework.

2.2 Skill Set to Program Gap Analysis
After students determined the skill set based on their job search and review of NSTISSI 4011 [1] and CNSSI 4016 [2], they compared their skill set with the program goals of the IAS program. Without seeing the original mapping created by the faculty at the time the program was designed, the students developed their own mapping between the determined skill set and the program goals. The student’s mapping and the original faculty mapping were close. Differences between them will be evaluated during the next program review. Their mapping indicated that all items in the knowledge skills they found were covered by at least one of the program goals.

Students also compared the program goals to the student learning outcomes of the courses required in the IAS program. Any differences in this document will also be evaluated at the next program review. Their mapping also indicated that the required courses sufficiently covered the program goals. At this point, students determined that the IAS program was designed to deliver all of the items in their knowledge skill set.

2.3 Skill Set to Security Experience Gap Analysis
In this step, each student was asked to identify the skill level they have retained from previous classwork. The students decided to use “comfort” level as their gauge of understanding the material. The students jointly developed a rubric ranging from 1 – 5 to determine their comfort level with each item, 1 being low comfort level and 5 being high. Once all students completed this activity, they computed the average comfort level of all of the students. For each identified skill, students needed to determine three things.

The first was their individual comfort level with the skill. The second was the course and student learning outcomes where they expected to learn that skill. The third was the assignments that they felt supported them learning that skill.

Students reviewed the results and selected a threshold of understanding that they decided was too low. The students discussed each of the “weak skills” that fell below the threshold. During their discussion of the weak skills, they were able to reference the course and outcome combinations and even assignments that addressed the weak skills. After discussing each of these weak skills, students documented their discussion.

Their documentation began to include some of their recommendations. Additionally, some of the discussions ended with “I remember that now”. This generated additional debate as students reminded each other about assignments and work efforts that others had forgotten. In these cases recommendations were revised as the students were able to remember what knowledge skills they had covered in classes.

2.4 Student Recommendations
At this point the students were ready to formalize their recommendations. Most of their recommendations had to do with providing an alternative delivery method for the material. Some examples include:

- Role playing interviews for case studies rather than printed information from interviews.
- More time to work on specific auditing techniques either in-class or under supervision rather than working on their own.
- Greater opportunity to audit live systems.
- Different opportunities for collaboration. (Interestingly enough, in some cases they wanted more collaboration and in other cases they wanted less collaboration.)
- Generally they wanted more independent work including homework assignments and labs.
- Generally they wanted more challenging assignments.

Faculty did discuss some of the constraints and limitations that affect our ability to implement some of their recommendations. In many cases faculty concurred with the recommendations as being desirable, but that constraints on the program made many of the recommendations impractical at this time.

3. BENEFITS
This process provided benefits to both students and faculty. The purpose of a program review through a self-study is recognized as a necessity for improving a program [3, 4]. In our case we wanted to see what the stakeholder’s (our student’s) impression were of that system since perceptions are frequently different based on perspective (e.g. faculty versus student).

3.1 Student Benefits
This process provided students with the opportunity to develop a solid understanding of what they learned throughout their IAS program. It provided them with a final review of what they learned and provided many of them with a higher level of self-confidence.

Students also developed a good understanding about what perspective employers want an appreciation for cooperation in a
large group process, and the amount of knowledge they had gained over their four year education. This coupled with a better understanding of their own skills, allowed them to create a professional development plan that will help them attain their career goals.

This process also allowed students to apply skills they learned in prior courses in different situations. For example, one of the previous courses discussed the process of auditing IT systems for compliance. Students were able to apply the auditing process to an academic program. Another previous course discussed issues of security awareness, training and education including creating assessments for trainings that they developed. Some of their recommendations included alternative methods of assessing student learning.

At the end of the semester the students put together a formal presentation that summarized their work, provided comments about the program, and identified areas of improvement that should be considered in future changes to the IAS program.

3.2 Faculty Benefits
Faculty gained insight into the types of jobs our students are seeking. In previous years, the majoring of our students were interested in jobs that were government or government-related. This process indicated that a larger percentage of our students are showing more interest in private sector jobs.

This process provided faculty with an indirect assessment of student learning and verification that the students are able to recognize how their knowledge skills can be applied to future job skills. The skill areas identified by the students as deficient (weak skills) have provided faculty a better understanding of areas where the educational process can be improved. Faculty realize that in many cases these weaknesses are a function of student perception and changes need to be considered in this context.

The process also provided an assessment of the entire curriculum by one of our major stakeholders. Faculty intend to use the results of this assessment as input into our Academic Program Review process.

4. CONCLUSION
Students enrolled in the IAS Seminar class for the spring 2012 semester completed an assessment of the entire curriculum in which they were enrolled. The process used by the students provided them with a solid understanding of both what they learned throughout their education and what they still need to learn as they enter the workforce.

Students indicated that the main deficiency within the program was in the delivery style of parts of the program. They provided recommendations for alternative delivery and assessment methods for various courses and student learning outcomes. Students determined that there were no deficiencies in program intent or implementation.

The IAS faculty are about to embark on the Academic Program Review process during the upcoming academic year. Faculty intend to use the student recommendations as part of the review process to evaluate the program and to inform recommendations for curriculum modifications.

5. ACKNOWLEDGMENTS
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6. REFERENCES

