



34th Annual **INCOSE**
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Experiential Learning with Part-time Internships with Industry Participants

Doing Before Graduating

2-6 July 2024

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Introduction

Going Beyond Lectures, In-class Assignments, Class Projects, Homework Assignments, and Case Studies

- Context: Virginia Public University, College of Business, Information Systems & Operations Management Area
- Experiential Learning (EXL) Activities go beyond the traditional classroom and allow students to get hands-on training prior to their graduation
- ***Professional Readiness Experiential Program (PREP)***
 - 2 Types of Projects: Business Process Improvement and Cyber Security
 - 2 Types of Students: Honors Program and High-Performing (Technical Professor Recommendations)

Introduction

Going Beyond Lectures, In-class Assignments, Class Projects, Homework Assignments, and Case Studies

- Quick Stats
 - 108 students completed the program since Spring 2021; 35 projects completed through 21 different industry participants
 - Summer 2024: 10 students working on 3 different projects with 2 different industry participants
 - Grants: 2 Commonwealth Cyber Initiative (CCI) Grants (\$200K + Industry Contributions); 1 National Institute of Standards and Technology (NIST) National Initiative for Cybersecurity Education (NICE) Grant (\$200K + Industry Contributions); & 1 Provost Grant (\$58.6K)

Business Process Improvement (BPI) Focused Projects

Solving Business Challenges Identified By the Industry Participant with Technological Solutions & Business Reasoning

- 2 – 4 Student Project Team
 - Business Challenge: Model & Quantify
 - Systems Analysis & Design Approach to Proposed Solutions to Address the Business Challenge(s)
 - Redesigned Process Model; Analysis of Alternatives of Potential Technical Solutions; Impact of the Recommended Solution on the Organization's current IT Infrastructure; Impact of the Recommended Solution on the System's User Interface and its Different Users
 - Implementation Plan – Development / Acquisition, Testing, Training, & Deployment/Transition
 - Risks & Risk Responses to Implementing the Recommended Solution
 - Turnover Documentation
 - Tracked in a Project Execution Plan

Business Process Improvement (BPI) Focused Projects

Solving Business Challenges Identified By the Industry Participant with Technological Solutions & Business Reasoning

- 15 Week Semester Schedule
 - Week 1: Introductions
 - Weeks 2 – 11: Agile Project Execution
 - Weeks 12 – 15: Client Project Presentations & Journal Finalization for Submissions
- 3-Credit Elective (Honors) Course

Cybersecurity Focused Projects

Enhancing the Cybersecurity Workforce and Skills to Meet the Market's Demands through Hands-on Projects

- 1 – 4 Students per Project Effort
 - Follows one Requirement: Projects are cybersecurity-focused and the work enhances the students' skills in the cybersecurity field so that they can contribute positively to the cybersecurity workforce upon or prior to their graduation
- 12-Week Schedule
 - Week 1: Introductions
 - Weeks 2 – 11: Agile Project Execution
 - Week 12: Client Presentations, Journal Submissions, Networking event!
 - Networking Event: Students, Industry Participants, Faculty, other Industry Contacts
- Currently Paid through the Grants with Industry Contributions
 - CCI: \$3K from grant / \$3K from Industry Participant
 - NIST NICE: \$5K from Grant + Industry Participant Workshops and other Contributions (certifications for example)
 - Not a specific for-credit course, but can take the 3-credit BPI / Honors Elective for the credits



Recruiting the Industry Participants

Picking the Right Partner Helps the Students and the Industry Participant Organization

- Where do we get Industry Participants from?
 - Our Networks, College's Network, Alumni Network, Industry Participant's Network
 - Corporate Sponsors
- Repeat Industry Participants are Great!!!
- Industry Participant Requirements:
 - 1 – Dedicate a minimum of 3 hours a week to meeting with our students
 - 2 – Scope challenging, exciting, and impactful projects that are compliant with our EXL program
 - 3 – Be responsive to email communication
 - 4 – Guide and mentor students throughout the process, like a typical internship
 - 5 – Provide the right amount of access and resources for the students to participate and complete the project
 - 6 – (for Cyber Grant Projects) Able to contribute the minimum amount of contribution pay



Scoping the Projects

Ensuring the Projects are the Right Amount of Complexity for the Duration of the Effort

- Complexity of the Project: Challenging but not Impossible
- Duration of the Project: Within the 10-Week Agile Project Execution timeframe
- Field of Study: Related to the Information Systems / Cybersecurity / Operations Management / Business Analytics Areas
- Help the Industry Participant Scope; Will Take Time; Multiple Iterations
 - Repeat Industry Participants will get the Process
- Worth the Time to Scope the Right Projects, Especially When the Time Comes to Execute
 - I Scope Months in Advanced, with the due date of 1-month prior to Project Start

Recruiting the Students

A Team Full of Beginners Should have a History of being Top-Level Performers

- For the Honors Elective Course:
 - 1 – Students must have taken a technical course (Advanced SQL, Data Mining, Application Programming in JAVA or Python, Data Warehousing, or Data Analytics)
 - 2 – Students must have a recommendation from that course's instructor
 - 3 – Students must have received a B or better in the prerequisite course.
- For the Grant-paid Cybersecurity Projects:
 - Industry Participant Posts Job Requisition for Students to Apply
 - Industry Participants Down Selects and Interviews
 - Industry Participant Chooses and Student is Onboarded into their System
- ***The Students will represent you, your program, and the University***

Past Projects

<https://www.b-ngac.com/Experiential%20Learning.html>

- Project 1: The student team provided process improvement recommendations to assist the Department of Defense's Cyber Crime Center's (DC3) Vulnerability Disclosure Program (VDP) scale their onboarding processes for the future.
- Project 2: The student team developed a graphical framework (Process of Information Transfer – PIT) that streamlines the transfer of sensitive information to allies (both in private and public sector) for the US Cyber Command.
- Project 3: The student team provided a small-business organization with a structured plan for an onboarding buddy system that allows experienced employees to be paired with new hires in order to foster company culture, and provide an excellent onboarding experience
- Project 4: The student team provided a startup company with multiple deliverables contributing to optimizing business processes by enhancing channel engagement, developing a new CRM, and a dashboard to monitor the company's standing incorporating a degree of automation.

Outcomes of the Experiential Learning Efforts

Industry & Workforce Impact, Enhancing Student Resumes & Competitiveness, Publications, & Sponsorships

- Students
 - Technical, Business, & Soft Skills Gained through “Hands-on Real-Project Experience”
 - Enhances their resumes, connections, and content examples for interviews
- Industry
 - Increases skills and workforce
 - Innovation type projects (less risky when using students) and address lack of resources
- Program
 - Publications
- University
 - Sponsorships & Grants
 - Corporate Partners

Lessons Learned

Mistakes can Suck, so Let's Not Make the Same Mistake Twice

- 1 – **Weekly meetings** are great since they help create an agile environment where the students, faculty, and industry participant regularly meet for progress updates, feedback, change requests, comradery, and more.
- 2 – **EXL faculty member should keep in close contact with the industry participants** and build the relationship so that it can yield other benefits like sponsorships, hiring events, guest lectures, etc.
- 3 – **Set expectations early with both the students and industry participants** so that all parties understand the goals, requirements, roles, and responsibilities of the EXL program.
- 4 – **Don't take on too many projects per semester** even if you're a seasoned program manager because these projects will have all entry-level folks, unlike a typical team where there is a mix of entry-level, mid-level, and senior-level folks to balance the workload.
- 5 – **Utilize the university's outreach, sponsorship, and alumni teams** to help find industry participants which will allow the EXL projects to be more diverse and with more committed industry participants.
- 6 – **Get to know the finance and research departments** so that grant opportunities are sent to you and you receive the support necessary when a grant is awarded.

Path Forward

Scaling & Sponsorship

- More Sections per Semesters to Support More Students & More Industry Participants
- More Sponsorships to Enhance Business Partnerships
- More Grant Support
- More Publications from the Project Efforts and PREP
- Continual PREP Networking Events



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