

Enhancing Soft and Entrepreneurial Skills Training for Two-Year College Technicians Using a Contextualized Business Simulation

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Project Summary

In the Virtual Enterprise (VE) program, students act as entrepreneurs – designing and operating a simulated firm in the classroom. Students interact locally as divisions of one enterprise facilitated by a trained instructor and support materials. Each classroom can connect with an international community of simulated firms (the IVE Partner Network) through a virtual economy (the IVE MarketMaker), an articulated series of events, and web-based community tools. The net effect is for students to acquire the soft- and entrepreneurial-skills demanded in today's workforce – for instance, teamwork, effective communication, and the ability to be flexible – while making concrete use of the content from their academic major.

This project addresses the soft- and entrepreneurial- skill needs of technicians by extending the Virtual Enterprise program to the information technology (IT) and biotechnology (BT) fields. The project is actively developing three courses:

Current Focus (for the 2008-2009 Academic Year)

- (1) **ve^{it}-Careers** is a drop-in for entry-level IT courses. The primary goal is to motivate students to pursue an IT career, and to give them an idea of the breadth of jobs in the industry and the underlying education and skills needed to achieve their desired position. In the engagement, the students form the staff of an IT department within an existing firm. The hierarchy of positions would be predetermined; the students would research those positions, apply for one and solve basic predetermined problems within that capacity.

Future Work (for the 2009-2010 Academic Year)

- (2) **ve^{it}-Capstone** is meant for the graduating IT student. The primary goal is to put into practice their IT skills, while developing an entrepreneurial mindset. Here, the students would create an IT consultancy centered around a product or service that is IT related. While evolving the technical aspects of the product/service, they would also handle the marketing, accounting and other facets of the business. Business structure would revolve around different departments (marketing, R&D, etc.) and would not be preset for the students. The instructor could predetermine the product or IT-subfield, if desired, to move the class in a particular direction; it's also possible to structure the business as a "new product team" within an existing enterprise.
- (3) **ve^{bt}-Capstone** is the Bio-Technology Virtual Enterprise. Its goals are similar to that of **ve^{it}-Capstone**.

¹ The views presented here are of the authors and do not necessarily reflect those of the National Science Foundation.

Intellectual Merit. The project will broaden the training of future IT and biotechnology technicians and equip them with the skills they need to advance in their fields and take advantage of new opportunities, whether to create their own businesses or improve existing ones. The project builds on a successful program, the Virtual Enterprise, which evaluation studies have found to be highly effective in promoting the development of entrepreneurial and soft skills. The Institute for Virtual Enterprise has eight years of experience in developing VE courses and materials to support program implementation and in training faculty. In addition, the findings from the evaluation of a previously-supported NSF pilot project validated the project's underlying concept that the VE model can be successfully infused with IT content and taught effectively to diverse student groups. The project responds to calls from government representatives and technology industry professionals for technician education that takes place in an active-learning, hands-on environment.

Broader Impacts. The project will develop a nationally replicable model for technician training that meets the need for technical workers with the entrepreneurial and soft skills to promote innovation and maintain the nation's leadership in a global economy. The model is potentially adaptable across the spectrum of technical fields and can also be adapted for use in four-year college and master's degree programs and to upgrade the skills of currently-employed technicians who have not had previous opportunities to develop entrepreneurial and soft skills.

The development and training for these courses is being performed in conjunction with National Science Foundation (NSF) Advanced Technology Education (ATE) Centers. Information Technology tracks are being developed in conjunction with BATEC (the Boston Area Advanced Technology Education Connections). The BioTechnology course is being authored with the assistance of Bio-Link.

Scope of Work

Outlined below is an updated scope of work that deals with the following project activities: development and revision of three types of VE courses, training of community college faculty (N=52 at 20 colleges), training of ATE Center staff (N=12 at 6 centers), and the provision of ongoing technical assistance to support VE course implementation.

Project Year 1 Activities:

- 1.1. Develop a ve^{it} -Careers Course and ve^{it} -Capstone course (project team with input from BATEC and industry representatives).
- 1.2. Support the development of a ve^{bt} -Capstone course. This work is covered under another NSF grant lead by Professor Arthur Zeitlin's team.
- 1.3. Train a minimum of three faculty members from four community colleges and two staff members from the BATEC ATE Center to implement ve^{it} -Careers and ve^{it} -Capstone. Simultaneously train BATEC staff to deliver ve^{it} training.
- 1.4. Provide technical assistance to faculty from the four community colleges trained in 1.3 above to adapt, plan and deliver both VE courses. Simultaneously train BATEC staff to provide technical assistance to community colleges.
- 1.5. Revise ve^{it} -Careers and ve^{it} -Capstone based on implementation experiences at four community colleges.

Year 1 Summary

- Two ve^{it} courses (Careers and Capstone) developed and revised by the project team.
- One ve^{bt} -Capstone course developed by the Zeitlin project team.
- Twelve community college faculty and two BATEC Center staff trained (N=14) in ve^{it} -Careers and ve^{it} -Capstone.
- Technical assistance provided to four community colleges to implement ve^{it} -Careers and Capstone courses.

Year One Progress

- A VE Faculty Development Seminar took place at Bunker Hill Community College in October 2008.
- Another seminar is scheduled to take place at Kingsborough Community College in February of 2009.

Project Year 2 Activities

- 2.1. Support and provide technical assistance to two BATEC staff members as they train a minimum of three faculty members from two community colleges to implement ve^{it} -Careers and/or ve^{it} -Capstone.
- 2.2. Train a minimum of three faculty members from four community colleges and two Bio-Link staff members to deliver ve^{bt} -Capstone training.
- 2.3. Provide technical assistance to faculty from the four community colleges trained in 2.2 above to adapt, plan and deliver ve^{bt} -Capstone. Simultaneously train Bio-Link to provide technical assistance to community colleges.
- 2.4. Revise ve^{bt} -Capstone based on its implementation at four community colleges and revise ve^{it} -Careers and ve^{it} -Capstone based on course implementation at all community colleges served by the project.

Year 2 Summary

- Project team refines/revises three VE courses: ve^{it} -Careers, ve^{it} -Capstone and ve^{bt} -Capstone.
- Support the training of two BATEC staff members as ve^{it} -Careers and ve^{it} -Capstone trainers at two community colleges (N=6).
- Train 12 community college faculty members and two Bio-Link staff members in ve^{bt} -Capstone (N=14)
- Provide technical assistance to four community colleges that are implementing ve^{bt} -Capstone courses.

Project Year 3 Activities

- 3.1. Two staff members from the Bio-Link ATE Center give ve^{bt} -Capstone training to three faculty members from two community colleges. Project staff support this training (N=6).
- 3.2. Project, BATEC and two Bio-Link Center staff train staff members from three IT-related and one Biotech-related ATE Center (2 staff members per center = 8 staff members) and two faculty members from two community colleges per center (4 centers X 2 faculty members = 16 faculty members). Training is provided in implementing ve^{it} -Careers, ve^{it} -Capstone, and ve^{bt} -Capstone.
- 3.3. All forms of VE are revised based on feedback from IT use in Project Years 1-3.

Year 3 Summary

- *ve^{it}* -Careers, *ve^{it}* -Capstone and *ve^{bt}* -Capstone produced in final form.
- Faculty from two community colleges implement *ve^{bt}* -Capstone (N=6).
- Two staff members from four ATE Centers receive training in all forms of VE (N=8).
- Two faculty from eight community colleges are trained in all forms of VE (N=16).

Virtual Enterprise: A Pedagogical Description²

Virtual Enterprise (VE) is active-learning pedagogy that can exist as a *free-standing* course or be *embedded* within a content course of any discipline, not just business courses. The premise is that students form and run a simulated business, through which they put their acquired interdisciplinary knowledge and skills into practical use. VE engages and motivates students because they are able to clearly understand the connection between what they've learned and how the "real world" makes use of it. It also obliges students to actively participate in their own learning through projects, group work, and discussion.

A prime example of a VE engagement *embedded* within a larger course is Student Development 10 (SD 10). When learning about proper resume writing and interview techniques, students live through the process instead of being told about it. The class forms a Head-Hunting firm which drafts virtual employment ads and solicits their colleagues to apply for these positions. Students interview students and make hiring decisions. This allows all students to reflect on the successes and mistakes made.

The embedded version of VE can be used in a multitude of content courses. It works best with topics that are directly applicable to the career world, and especially when the learning involves group work, interaction, and hands-on tasks. In an English literature and composition course, for example, the students could be employees of a literary magazine. As a company, they would have to read and report on a genre of works, keeping in mind that their audience expects high-quality, peer-edited, and original reporting. The semester would culminate with a group assembling all the writing into a deliverable magazine to be presented to the course's instructor and even the College community.

In a *free-standing* course, VE students spend an entire semester running all aspects of the business. These technology-driven, entrepreneurial enterprises act globally, trading their products and services through a worldwide network of 4,000 firms in more than 40 countries. In the same way that commercial airline pilots are trained in a flight simulator, VE students use a model of business reality in order to learn the necessary skills to be successful in the current knowledge- and information-based economy. The effect is to immerse students in a fully functioning business world where taxes and insurance premiums must be paid, ad space must be negotiated, employee training must be planned, e-mails must be responded to, faxes must be sent, products must be developed and marketed, and most importantly, commitments to co-workers must be honored.

The CUNY Institute for Virtual Enterprise (IVE) was founded to support active-learning engagements, among which is Virtual Enterprise, throughout all campuses of the City University. IVE's central office is Kingsborough; it is the only University-wide initiative to come from a Community College. The Institute primarily focuses on programs in Entrepreneurship, Leadership, Sustainable Development, and Financial Literacy.

² Taken from "Innovative Pedagogies" section of the [Kingsborough Community College Faculty Handbook](#); passage authored by: E. Troutt, handbook editor: J. Graziano-King.

VE-IT Careers Summary

The simulation is designed to be a third of a 3-hour per week class. It unfolds over the course of the entire semester, falling in the third class hour of each week. Thus there are 15 hours of simulation in a course totaling 45 instructional hours.

The students will form solely the IT Department of an existing firm. It is suggested that the simulated department goes through four phases:

- I. Career and Department Exploration (~4 hours)
- II. Problem Identification (~3 hours)
- III. Problem Solving (~3 hours)
- IV. Reflection and Revision (~3 hours)

Presentations account for the remaining 2 instructional hours.

Each area within the department is staffed by a team of students (generally of size 2-4). The departmental divisions are:

- I. Programming and Applications
- II. Business Intelligence and Databases
- III. Security
- IV. Network Administration

Further details are available on the sample syllabus (not included here).

VE-IT Capstone Summary

The students form a free-standing IT Consultancy firm. A product is developed (with real, implemented deliverables) and packaged with the appropriate marketing and documentation. Depending on the interests of the Instructor, the product may be: a “disruptive” invention, a competitor to an existing product, or an answer to the request of an outside firm. (As in the Careers course, firms can be within the VE network or private-sector partners.)

The semester generally follows the plan:

1. Review breadth of information technology companies and products.
2. Select a niche within Information Technology; create of a corporate identity.
3. Research and design the corporate hierarchy, including departments and officers. (Typical departments include: marketing, finance, human resources, and R&D.) Staff positions within the hierarchy.
4. Design a flagship product or service; produce a demonstration.
5. Conduct market research (on VE students or corporate partners); or in the case of responding to an outside firm’s need, present the limited version of the product for feedback.
6. Solicit funding by developing the enterprise’s business plan, including identifying target consumers and marketing strategy.
7. Implement product, starting with implementation plans and Gantt charts, and ending with proper technical documentation.
8. Develop promotional materials, including analysis specifying TCO and ROI; develop website and presentation for non-technical audiences.
9. Presentation of product(s) to prospective consumers and/or integrators.

Approximate Time: a full 3-credit course; approximately 45 hours of simulation.