When the Virtual Becomes Real: Student Learning in the Virtual Enterprises Program

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Virtual Enterprises International is a high school program that teaches students about business by having them create and operate their own virtual firms. The program enables students to learn about careers, develop interpersonal and organizational skills, and use technology.

The use of virtual firms as an instructional tool is well-established in Europe, and in 1994, a group of New York City high school superintendents visited Vienna, Austria, to observe the virtual firms in its secondary schools. Two years later, the New York City Department of Education implemented the Virtual Enterprises (VE) program in seven New York City high schools, the first program of its kind in the United States. By 2006-07, the VE program was operating in 53 New York City schools and in over 450 institutions across the country.

The New York City VE Central Office invited the Institute on Education and the Economy (IEE) at Teachers College, Columbia University, to conduct the first external study of the program. This Brief presents a description of the Virtual Enterprises (VE) program, a summary of IEE's findings, and recommendations to enhance the program's effectiveness.

Overview of the Virtual Enterprises Program

Virtual Enterprises (VE) aims to prepare students for their futures through the use of several educational practices that have been shown to benefit students' academic and career preparation. The program integrates experiences outside of school with classroom learning. Thus, work-based learning and positive interactions with adults outside the classroom play a central role in the program.

During a double-period class each school day, VE students operate a virtual firm, developing and marketing a line of virtual products and services. The firm is designed to replicate a real business in both structure and practice. Thus, the classroom is set up like an office, with computer workstations for each student, and students are assigned to work in different departments, typically Administration, Accounting, Sales/Marketing, Design, and Human Resources. The class selects a CEO, and a vice president oversees each department. Students work in teams to make decisions about how to complete their departmental tasks, which include developing and implementing payroll and billing procedures, creating a business plan, designing a sales catalogue, conducting employee evaluations, and purchasing items from other virtual firms. The VE program thus employs a student-centered approach to learning that emphasizes project-based, collaborative learning.

In New York City, the VE Central Office is part of the City's Department of Education. With only five staff members, it provides many services: professional development for the teachers (called coordinators); technical assistance; the operation of a virtual online banking system and marketplace, which students use in the buying and selling of products; curriculum development; coordination of special events; oversight of students in school-year and summer internships; collaboration with local colleges where VE students take courses; and workshops. VE staff monitor the program's effectiveness through regular site visits, through assessment tests that measure students' mastery of the curriculum, and through analysis of data such as student attendance. VE Central also provides training and materials for programs in other states.

Study Methodology

Sample Selection. The IEE study sample consisted of ten high schools: two per borough (the Bronx, Brooklyn, Manhattan, Queens, and Staten Island). Since some schools had two VE firms, researchers reviewed 16 firms. VE Central assisted in the selection process by recommending programs that it considered to be well implemented. While most of the firms selected had been in existence for five to ten years, two were only in their second year of operation.

The high schools in the sample were all comprehensive schools. The majority were large, with 2,000 to 4,000 students. Their student populations were predominantly Hispanic and Black, although at four of the schools Asian/Pacific Islander students comprised one-fourth of the total enrollment. A few schools had been or were in the process of being broken down into smaller learning communities with career themes. While the programs in our sample reflect geographic and racial/ethnic diversity, they are not necessarily representative of VE programs since they were all considered better-established programs. Thus, the results from this study cannot be generalized to all VE programs.

Data Collection. We collected data in fall 2006 and spring 2007. To evaluate the VE program structure and curricula, we observed the 16 VE classes in our sample and interviewed the coordinators. We also observed VE student workshops, events and competitions, and staff professional development meetings. We conducted interviews with the staff of VE Central about the administration of the program. To examine student perceptions of the program, we administered an end-of-the-year student survey consisting of questions designed in collaboration with VE Central. The survey's 52 questions covered topics such as the student's participation in VE, grades, college and career preparation, and future plans. Completed surveys were received from 215 students in the 16 VE firms.

Data Analysis. Data from the observations and interviews were used to develop the survey questions, to provide a context for the survey findings, and to explore the consistency of program implementation across the ten schools. We did not find vastly different program implementation.

To analyze the survey data, six outcome measures were created by taking the average of a participant's

responses to sets of related questions regarding: (1) the overall influence of VE, (2) VE's help in developing job skills, (3) VE's influence on learning, (4) the influence of a VE teacher, (5) VE's help in preparing for college, and (6) VE's help in preparing for a career.

A series of statistical models were run with each of the six outcome measures as a dependent variable, controlling for the gender, age, race/ethnicity, GPA, and pre-program motivation/interest of the student. Pre-program motivation/interest was found to be statistically significant for every outcome except college preparation. This result may reflect self-selection bias: underlying factors that led to a student's pre-program motivation/interest may have also contributed to the same student's views about the benefits of participating in VE. The result may also indicate a self-confirmation effect: a student's reporting of a positive program experience in the end-of-the-year survey may have influenced his or her reporting of positive pre-program motivation/interest in the same survey.

Neither gender nor race/ethnicity was found to be statistically significant for any of the outcomes. Given that many career and technical education fields continue to be dominated by males, and given the disparities found in the academic performance of different racial/ethnic groups, this is an encouraging finding.

Students in the Program

Of the 215 students who completed our survey, respondents were divided evenly between males and females. The majority of these students were from underrepresented groups: 33 percent were Hispanic, 33 percent were Black, 18 percent were Asian or Pacific Islander, and 15 percent were White. Most of the students were seniors (83 percent), followed by juniors (16 percent); only two students were sophomores. Thirteen percent of the students had previously been English Language Learners (ELL). Three students were Special Education students. Almost half reported that the highest level of education attained by their mother was high school graduation or less. Almost half the students surveyed indicated that the main reason why they applied to VE was an interest in business.

Students in VE are not necessarily representative of the students in their schools since students are not randomly assigned to the program. A variety of recruitment methods are used to attract students who might be "a good fit" for VE. The VE coordinators visit classrooms to promote the program, distribute "job applications," ask teachers for recommendations, and invite students to come in for "job interviews."

The VE programs vary in whether they set formal eligibility criteria. Two of the sample schools set relatively high minimum GPAs, which is reflected in the fact that 60 percent of the respondents reported having GPAs over 3.0. Still, one coordinator said that he is "less concerned with grades and more with interest." The coordinators do want students with writing and computer skills. VE students frequently use computer programs and the Internet to complete their tasks (though 14 percent of the students surveyed had taken no computer courses prior to participation in the VE program). In addition to any official selection criteria, VE coordinators look for certain qualities in prospective students, including motivation and maturity, so participants can handle the work and stress of deadlines and competitions, and can work independently.

In reality, because of complexities in high school organization and student scheduling, many of the coordinators find it difficult to recruit enough students for the 25 slots recommended by the VE Central Office. Thus, despite stated participation criteria, each VE program often ends up with a mix of students, including those who are self-motivated to enroll, those who are recommended by a teacher, and those who are placed in the course by a guidance counselor. Ideally, this mix would encourage students who need some extra motivation because the program requires teamwork, but some participants expressed frustration in working with unmotivated students. Sixty percent of the student respondents indicated that some VE students did not work hard. Thus, the program faces a tradeoff in its selection process — coordinators prefer students who are self-motivated and enthusiastic about the program, but that inclination may leave out disengaged students who might benefit from and become motivated by a more applied, student-centered environment in their senior year.

Teachers and Teaching Strategies

Student-centered learning is at the core of the VE program. Instead of using a traditional lecture format, VE promotes student-directed, project-based learning. On a typical day, students design brochures in Photoshop, calculate their taxes in Excel, hold an executive meeting, or buy (virtual) gift baskets over the Internet. They work independently or in small groups and have discretion over how to accomplish their different tasks. For many students, having autonomy over their learning is a new experience that can be both exciting and to some extent unnerving. "It's us, just running everything. We're so used to having the teacher telling us what to do," said one VE student.

VE teachers are called coordinators because their job is to oversee and guide student learning. The VE curriculum describes the teacher's role as changing from "sage on the stage" to "guide on the side." In fact, we observed a range of teaching strategies. Some coordinators took a more directive role, leading student meetings and voicing their opinion on how tasks should be completed. Others acted more as managers, checking in with students to make sure they were on task. Still other coordinators acted as resources, circulating to offer assistance to small groups of students.

VE Central has posted the VE curriculum online and provides the coordinators with continual professional development, including a week-long orientation for new coordinators and monthly meetings with VE Central staff to discuss concerns, refresh knowledge of a selected topic, and learn more about upcoming VE events.

Career Preparation and Development of Workplace Skills

Our survey results suggest that VE had a largely positive influence on students' career preparation.

According to the self-reports, through "working" in the firm, students became competent in a variety of workplace skills. They mastered office skills, such as answering telephone calls, writing checks, preparing invoices, drafting memos, sending faxes, and creating agendas. They used computer applications for most of their work, becoming proficient in programs like Microsoft Word, Excel, PowerPoint, Illustrator, and Publisher. Periodic workshops run by VE Central taught a limited number of students about more specialized tasks, such as how to fill out tax forms, how to write a business plan, and how to create a budget. VE Central also offers job readiness training for interested VE students that provides tips on writing resumes, preparing for interviews, and finding a job.

More generally, the VE program appears to foster critical thinking and problem-solving skills among students. Almost three-fourths of the student respondents indicated that the program helped them develop problem-solving skills. The VE environment also encourages students to develop interpersonal skills and work cooperatively in a team. Seventy-four percent of the respondents indicated that VE helped them learn to work with different types of people.

While VE promotes teamwork, competition also plays a significant role in the program. VE sponsors a number of high profile local and national competitions that involve judges from the business world, award ceremonies, and trophies. While competitions are time consuming and sometimes stressful, they also energize the students, provide recognition for their work and for the program, and serve as an important learning experience: 72 percent of the student respondents indicated that VE helped them feel comfortable working with adults, and 81 percent indicated that VE helped them know how to behave in professional situations. Overall, 79 percent of the students indicated that VE helped them develop realistic expectations of the workplace.

Academic Skills and College Preparation

By combining a rigorous curriculum with a hands-on application of many academic skills, VE aims to prepare students for both careers and college. The VE curriculum includes a strong academic component focused on writing, speaking, math, and technology skills, which students learn as they operate their firms. The program seeks to motivate students by setting high expectations and showing them the relevance of their education. Survey responses indicate that the approach is successful: 58 percent of the students found that what they learned in VE was more challenging than what they learned in their other classes, 68 percent indicated that VE motivated them more than their other courses did, and 53 percent indicated that VE motivated them to do better in their other classes.

It should be noted, however, that the level of academic rigor and student engagement sometimes varies considerably by each student's position within their firm. Data from our visits to the programs suggest that students in leadership roles have greater responsibilities and appear to have more opportunities to participate in academically rigorous work. Thus, it may be necessary for coordinators to assign additional projects to ensure that all students are improving their skills and that each student's own level of initiative does not alone determine how much they gain from the class.

In some VE courses, students study an applied economics curriculum, thereby linking the career technical component of VE with an academic subject required for high school graduation. Including economics in VE seems like a promising way to integrate academics into the program, and also to work with students' scheduling requirements. When economics is taught, it is typically presented in a traditional format during a portion of VE class time. One coordinator, however, tried to create a college-like atmosphere by giving her students assigned economics readings ahead of time and expecting students to be prepared to discuss them in class. Adopting this kind of college format may be a less time-consuming way to incorporate economics into VE while also providing students with an opportunity to participate in a college-like course experience.

Participating in VE helped the majority of the student respondents feel more prepared for college: 66 percent indicated that VE improved their confidence about being prepared to do college work, 63 percent reported that VE made them believe that college was a realistic option for them, 46 percent said that their VE teacher helped them with college planning, and 67 percent indicated that VE helped them focus on what they wanted to study in college.

VE students can enroll in business-related college-credit courses for no cost at local partnering colleges. Proponents of dual enrollment believe that it helps students understand the academic and social expectations of college and thus gain a broad orientation to college before they leave high school (for findings about the effects of dual enrollment, see Karp, Calcagno, Hughes, Jeong, & Bailey, 2007). One-fourth of the student respondents took a college course through VE, and almost 90 percent of them reported receiving either an A or a B in such a course.

Finally, 91 percent of VE seniors reported that they will go to college in the fall. Eighty-seven percent of them plan to attend full time, which is significant, as full-time attendance is associated with a greater likelihood of earning a degree. Moreover, 47 percent of the survey respondents indicated that they intend to major in business in college.

Conclusion and Recommendations

Our findings show that the Virtual Enterprises program helps students to gain job-readiness and academic skills, which help prepare them for both careers and college. Certainly the program's greatest strength is its student-centered, project-based approach. VE also provides teachers

with the flexibility to be creative and the opportunity to work with students on an individual basis. VE is clearly not a typical high school class, and it does require more resources to support its broad program activities. We recommend that the New York City Department of Education continue to support the VE program and consider expanding it to other schools. We also have some more specific recommendations.

Include a computer literacy requirement for all New York City students. Proficiency in computer applications is critical to the success of all students, whether they continue on to postsecondary education or to a career, yet the NYC Department of Education does not require students to take a computer course. We therefore recommend that the NYC Department of Education ensure that all graduating students are computer literate and, ideally, that computer skills are taught as part of an applied, project-based curriculum (as in VE).

Provide more support and staffing for the VE Central Office. At the time of our study, the VE Central Office had only five staff members, and even that low staffing level has since decreased. The VE staff that we interviewed shared a feeling of being overwhelmed by their responsibilities; nevertheless, the services that the staff provide are integral to the quality of the program and the students' experiences. We therefore recommend that the NYC Department of Education consider increasing staff support for the program to ensure its quality and to expand it to other schools.

Increase the number of VE students taking college courses and provide related student supports. Taking college courses offered through the VE program gives students the opportunity to sample the college experience and to earn free college credits. Yet, only about one-fourth of VE students currently enroll in such college courses. We recommend that the VE program more strongly promote dual enrollment and strengthen mentoring and tutoring supports for students enrolled in college courses.

Include more students in VE Central workshops. Because of space constraints, only a few students from each school can participate in the VE Central Office's workshops on business and technical topics. To expand participation, VE should consider offering workshops at different schools or creating an online tutorial that can be accessed by all students and coordinators.

Provide opportunities for all students to engage in academically rigorous work. Students in virtual firm leadership positions often have greater responsibilities and more opportunities to engage in academically rigorous work than do other students. While VE Central recommends that program coordinators rotate students through multiple positions, we saw no evidence that this occurs. In the absence of job rotation, coordinators should assign additional projects or tasks to ensure that all students are fully participating in each firm's business and improving their academic skills.

Integrate economics into all VE programs. We recommend that all VE programs integrate economics into the VE curriculum so that students can thus fulfill the economics requirement for high school graduation. Since VE students learn and apply economics concepts while operating their virtual firms, it seems practical for the program to put a stronger emphasis in this area.

Collect data on student outcomes. In addition to the VE Central Office's data collection and student assessment efforts, research is needed to determine the impact of VE on students' academic and career outcomes. A rigorous evaluation using a comparison group of non-Virtual Enterprises students would demonstrate that any outcomes are the result of program participation and not other factors.

Expand VE to a broad range of students. Seventy-eight percent of the student respondents indicated that VE helped them believe that they could accomplish their goals. Given the barriers to college participation and completion, it is critical to support programs, such as VE, that help students find relevance in their studies and set higher aspirations for the future. The NYC Department of Education should therefore consider promoting broad access to VE for those students who struggle to find meaning and direction in their education.

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