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Honors Program

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The Honors Program at Bridgewater

The Honors Program at Bridgewater provides an opportunity for gifted and highly motivated students to reach their full academic potential. The senior Honors Thesis, completed under the guidance of a faculty mentor in the student’s major field, is the capstone of the program.

JENNIFER JUTILA

Jennifer Jutila is working in securities operations with State Street Bank & Trust Company. As she pursues a career in finance, she plans to obtain a master’s degree in financial analysis and hopefully utilize what she has learned of linear programming to devise optimal investment portfolios.

My studies as a mathematics major with a minor in management science culminated in an honors thesis project on linear programming. Linear programming incorporates these two fields in that it is a contemporary mathematical approach to solving complex planning problems that arise in industry, operations management, and economics. Linear programming provides a means to find the most efficient allocation of resources by using linear algebra to optimize a linear function of many variables subject to linear constraints. Its most common applications include finding the least expensive means of meeting product specifications, determining optimal production processes and/or products, finding the most efficient transportation routes, and determining the best schedules for production and sales.

Once a resource allocation problem is identified, linear programming can be applied to break it down into an objective function made up of decision variables subject to any relevant linear constraints. In other words, the first step in solving any linear programming problem would be to establish an objective, say to maximize profits. We would then identify the variables associated with the choices to be made and any constraints present. We can express both our objective and any constraints as linear functions of the decision variables. These linear functions represent the set of mathematical relationships present within the problem. By maximizing these functions using the operations defined in linear algebra, we can solve for the best mix of current resources in order to maximize profits. The same holds true for minimizing a function, say to minimize transportation costs. What is truly fascinating about linear programming problems is that with the ever increasing power of computers we can implement this solution method to solve problems involving thousands of variables and constraints. In essence, linear programming can be applied to solve even the most complex of planning problems.

To illustrate how linear programming works, let’s consider a simple situation. For example, consider a stock broker trying to compile a portfolio of assets that will produce the most profit. Her situation would involve many variables, perhaps including the types of securities to purchase (i.e. common or preferred stocks, municipal or corporate bonds, treasury notes, CD’s, etc.), in addition to the current market prices, interest rates, and risks associated with each. She would also be restricted by constraints such as the amount of money she has available for investing, time constraints, the availability of securities for purchase as well as regulatory approvals, and much more. Using linear programming we could mathematically deduce from all of the possible combinations of securities which would be the most profitable, while staying within the current limitations. Although this maybe an oversimplified explanation of how this newer branch of mathematics works in reality linear programming is extremely valuable simply because it can be applied to so many diverse situations. Computer programs of this solution method are currently being used to find the most efficient airport gate and terminal scheduling, telecommunication networking, and oil pipelining.

In today’s day and age where we are all rushing to or from something, the most efficient path to anywhere is certainly sought after. I am grateful to Professor Hang Ling Chang of the mathematics department, who became my mentor during this project, for offering his expertise and insight. My honors thesis became the highlight of my studies at Bridgewater.
DORIS MUIRHEAD

Doris is studying for her law degree at New England School of Law in Boston and plans a career in criminal law. She has also begun writing her first novel.

In my senior year, I had the honor of being selected for the Bridgewater-at-Oxford Program on a Davis Alumni Scholarship. At Oxford, the idea for my English thesis germinated in a literature course which explored three novels: Emily Bronte’s Wuthering Heights, George Eliot’s The Mill on the Floss, and Thomas Hardy’s Jude the Obscure. The idea of animal imagery and how it was used to define the heroes and heroines intrigued me. Drawing on my minor in philosophy, I tried to show how theories of evolution might have influenced the authors’ writing in these three nineteenth-century novels.

Emily Bronte was one of the first novelists to juxtapose man and animal. Because she pre-dated evolutionists such as Herbert Spencer and Charles Darwin, Bronte obviously could not have been exposed to their scientific theories. Nevertheless, she had the foresight to recognize the inherent nature of man and animal; and she used her ideas to depict man using animal imagery.

Unlike Bronte, who could not have known of evolutionary theory, George Eliot read Darwin’s The Origin of Species. Eliot’s vision of human nature was rooted in the belief that man is related to animals by his long evolutionary past. Her use of animal imagery colored her novels.

In The Mill on the Floss, the younger characters are alluded to as young animals; Maggie is kittenish, Tom is puppyish and Wakem is collish. Eliot often used this analogy to portray the innocence of the children.

Logically, one would expect man to be placed at the apex of the evolutionary chain; however, Eliot often relegates her characters to a lower evolutionary level. Her main character, Maggie, is depicted as analogous to inferior animals. In the novel, Tom’s “desire for mastery over the inferior animals, wild and domestic, including cockchafer, neighbors’ dogs, and small sisters” is a promising attribute. Hence, the animal imagery is often used to produce satire and irony.

Just as Eliot used animal imagery to depict individuals, she also used it to depict whole segments of society. She compares the people of St. Oggs to ants and beavers, two of the most industrious and busiest creatures on earth. This analogy suggests these people’s acquiescence to their programmed inherent nature. They appear not to have a Christian viewpoint, but rather a resigned acceptance of their place in the general course of things. One of George Eliot’s central themes is that man’s nature and his acts and deeds stretch out into the past and into the future. Man lives in a world of cause and consequence, and like the animal he will survive only if he can adapt.

Thomas Hardy also wrote about people who transgressed social bounds and used animal imagery to portray their character. His views on social order were similar to those of George Eliot. These beliefs tended to be unpopular with the general public, for they implied that man cannot create his own order; he, like the animal, is inexorably linked to a continuum from which there is no escape. One cannot hope to leap ahead, but rather one must move up the social ladder in time or in successive generations.

The main character in Jude the Obscure tried to transgress his social bounds. He is depicted as a trapped bird, thwarted in his desire to soar to new heights. Other bird imagery is used to portray pain and suffering. Sue, Jude’s wife, is alluded to as a pitiful bird. Someone was always opening her cage door and “letting her go in such an obviously suicidal way.” Hardy often used animal imagery to portray entrapment and suffering.

Emily Bronte, George Eliot and Thomas Hardy all used animal imagery to elucidate main characters in the novels and to reinforce major themes. All three broke with conventional Christian thought and shocked their readers with the immoral implications that man’s behavior is due to inherent, atavistic impulses similar to those of animals.

GREG ST. LAWRENCE

Greg St. Lawrence is working in computer technical support for Inter-pay, a payroll outsourcing company. He is also a member of the Finance Committee of the Town of North Attleboro.

My honors thesis is entitled “The Application of Regime Analysis to the Introduction of Computer Technology in Municipal Government.” It involves both the public administration and international relations areas of political science and also draws on my personal computer expertise and experience. My choice of topic was influenced by several factors, including my introduction to regime analysis as used in international law in Dr. Mozaffar’s International Law and Organization class and my introduction to public administration in Dr. Gelles’ Public Finance class. Another strong influence was my work, as an intern, for the North Attleboro Landfill Department, where I learned firsthand of the difficulty a poorly planned introduction of new technology can cause in the work environment.

My thesis begins by defining regime analysis, which is best described as the idea that formal and informal rules dictate the behavior of actors in any situation. It also assumes that there is no ‘natural’ tendency toward cooperation or conflict. This is in stark contrast to the realist and liberal theories of conventional political science. Realists assume that the world moves towards conflict and liberals assume that the world moves toward cooperation. Regime theorists believe that rules establish actors’ courses of action. Regime analysis has a strong place in the study of international relations. Arthur Stein states that regimes in the international arena are also created to deal with collective suboptimal outcomes of individuals pursuing their own self-interest. In other words regimes are a system of rules to allow actors to obtain an outcome working together that each could not obtain on his or her own.
The workplace can be a site of battles and wars, of individuals protecting their interests and defensive maneuvers, as much as the realm of international politics. The introduction of technology into a workplace can lead to distrust, confusion and the displacement of power systems. My thesis provides public administrators with a framework for analysis to handle and predict the difficulties that may result from implementing new technology.

The thesis begins by identifying three regimes that interact: the governing regime, the information systems regime and the information systems support regime. Each of these regimes are made up of actors with differing goals, fears and areas to protect.

The example of the New York City Human Resources Department stresses the importance of the managers working as facilitators to encourage communication between computer users and outside consultants. Another important lesson from the example is that use of prototype systems is important in evaluating the effectiveness of the application of technology.

The thesis goes on to examine how regime analysis could be applied to even the component level of selection. It highlights the importance of the human resources component of introducing technology into a workforce, and presents two case studies: North Attleboro, MA, where I served on the computer study committee, and Bridgewater, MA, where I attended college. Both of these case studies showed the importance of involving people in the selection process and the applicability of regime analysis. I discovered that regime analysis is best suited for large questions of general guidance but becomes cumbersome at levels of analysis which are extremely fine in scale.

The thesis proved to be of both practical and academic value, and I have found its framework a valuable reference in my work.

DEBORAH J. GODDARD

Deborah J. Goddard lives and works in Boston.

In April and May of 1994, I represented BSC at an historical conference at the John F. Kennedy Library in Boston. The conference involved a group of twenty-five to fifty college students who met twice and studied the history and consequences of the 1964 Civil Rights Act. The conference was a commemoration of the thirtieth anniversary of the signing of the Act, which drastically changed the treatment of people of color in America by barring discrimination in public accommodations, facilities, and schools.

Also participating in the meetings were distinguished guests who had participated in the Civil Rights Movement. One of the guests was Dorothy Height, a black woman with whom I was unfamiliar. She had been very active in the Movement, and she made a comment that shocked me and inspired me to write my thesis: that the role women played in the Civil Rights Movement has never been recognized. She went on to say that it was a woman, Rosa Parks, who started the Movement. Moreover, the Movement would not have happened without women.

Her comment shocked me because I had been unaware of women's participation in the Civil Rights Movement of the 1960's. I remember, as a child, learning of Rosa Parks, the "poor colored lady" who was too tired to give up her seat to a white man on a segregated public bus in Montgomery, Alabama. Historical textbooks confirmed that my memory was correct. So why was Ms. Height depicting Rosa Parks as a rebel? Who were these women she mentioned as leaders of the Civil Rights Movement?

History has recorded that the leaders of the Civil Rights Movement were men, specifically Martin Luther King, Ralph Abernathy, Roy Wilkens, and Jesse Jackson. Surely, if women had led or otherwise participated, their contributions would be recognized in American history books. But I was compelled to further investigate Ms. Height's comment.

I began my research by watching a fourteen part video series, "Eyes on the Prize," a documentary about the Civil Rights Movement. Ms. Height was correct: there had been many women in the Movement. Moreover, I learned that Rosa Parks had attended college, worked part-time for the NAACP, and that her refusal to give up her seat on the bus was a planned and deliberate action aimed at sparking what became the Civil Rights Movement. As I continued my research I discovered that this country has had a rich legacy of black female political leaders. In fact, for the more than three hundred years that women of African origin have lived in the United States, they have been involved in every political movement in America.

Sadly, the achievements of these women are virtually untold in the annals of American history. Additionally, because much of the history of black people in America is orally transmitted, the precious few details available are relegated to African-American text books. A discussion of black female political history in America, however, accomplishes two purposes.

First, it substantiates the fact that black women have always participated, and have been unrecognized for their roles in facilitating political change in America.

Second, the historical perspective of black female political participation and leadership in America provides a foundation which proves that the black female leadership in the Civil Rights Movement in America was not novel or unique. Clearly, it confirmed Ms. Height's comment which became my thesis topic.

Despite the accomplishments of all the black women described in my thesis, their battle against racism and sexism continues. Despite the sweeping changes in American society facilitated by the Civil Rights Act, the efforts and achievements of black women in America are largely untold. During the three decades since the Civil Rights Act of 1964 became law, movies have been made to pay tribute to the male leaders while three centuries of black female leadership in America remains unknown. Until every historical text integrates black women into American history they will remain hobbled by the chains of societal dogma. And until all Americans recognize the role of black women in planning, igniting, and perpetuating the Civil Rights Movement, they will remain unsung heroines.