

Group Name: The Watsonians

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Business Case Name: Reinventing CUNY Administration

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Submission Video Link:

<https://www.youtube.com/watch?v=JKahObRT-WU>

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(Youtube link)

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Case Prompt: Higher Education

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(Higher Education or City Services)

## **IBM Watson Case Competition – Business Case Study**

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Academic guidance is an investment highly valued by college students, but it's one that colleges don't frequently make. Students universally need guidance – they need faculty knowledgeable about their career options and academic advisers knowledgeable about their scholastic pathways. Baruch's open door office hour policy makes school faculty available to any and all students who need advice, but the same is infeasible for the advisement office. Baruch provides just ten full-time guidance advisers and a handful of student advisers to a student body of more than 14,000 undergraduates – put another way, there are about 1,400 students per adviser, more than double the national mean of 600 for institutions of similar size. This imbalance verges on absurd: in the days preceding and during class registration week, the advisement center closes its doors two hours ahead of schedule, simply due to the sheer volume of requests. During the busiest and most critical parts of the school year advisers are not just unable to actively follow their students' paths through college – they are rendered incapable of providing even basic ask-and-tell services. These problems are manifested in Baruch's retention rate: CUNY-wide data puts the four-year graduation rate at CUNY colleges at just 22.9%, and the four-year enrollment rate across institutions at just 43.7%. Bearcat advisers simply cannot field the number of requests that they are made to handle, resulting in subpar service and, ultimately, low collegiate engagement.

One solution to this problem would be to hire additional guidance counselors. However, counselors need to be thoroughly trained to understand CUNY's labyrinthine policies, and there is no obvious space at Baruch into which an expansion of the advisement office, pressed as it is against the English department offices, can take place. Hiring more counselors would also mesh poorly with CUNY's ongoing hybrid initiative, which aims to bring 20 percent or more of student instruction online in the next few years: if the college wishes to focus on allowing students to finish their degrees on their own time, it cannot as easily justify tying those students to on-campus advisers with limited office hours. If Baruch refrains from hiring advisers, it is to the benefit of its students to make the existing advisers more effective at their jobs. Baruch advisers have a few automated tools on hand to assist them in their task: principally, DegreeWorks, a system allowing students and counselors to review a student's remaining degree requirements in a structured manner. But this system no longer works – the administration has been slow to renew the system to fit the new requirements of the Pathways system, leaving advisers essentially unaided. This problem of maintenance is one that's endemic to any large college that's party to an even larger network, as Baruch is to the CUNY system – that rolling out Pathways and CUNYFirst broke many of the tools that the school's offices previously found essential is an open secret and a major element of ongoing animosity between central and lower administrators. So while implementing naive advisement software would be an improvement over the current state of affairs, any system implemented off-the-shelf would be too inflexible not to require regular maintenance, and experience shows that such maintenance cannot be reliably expected of Baruch.

We propose an alternative system that we believe would provide a sorely-needed scene change for Baruch's current advisement environment. Such a system would have three major advantages over existing solutions: it would be able to singlehandedly catalogue all of the

different procedures associated with CUNY, allowing it to keep abreast of and surpass the knowledge base of even the most highly attenuated college adviser; unlike individual advisers, Watson can process and track Baruch's college's entire student body in near-real time, something the college simply cannot replicate otherwise; and it would be able to react flexibly to collegiate procedural changes, again in real time, making sense of and cataloguing overlapping layers of procedures and solutions without the need for regular human intervention.

Our solution presents itself in two separate but related branches: one intended for students and one for advisers. The basic unit of both is the student profile – a compilation of all of the information available on the student, from grades to major to classes taken, sampled nightly from the CUNYfirst student database. This composes the structured half of the corpus; the unstructured half consists of the widest possible range of procedural documents, handbooks, event pages, interoffice communiques, and paperwork forms that can be made available to the system, also updated on a regular basis.

Watson creates associations based on the inferences that it draws from its understanding of college procedures. It then evaluates each student profile against these criteria, coming up with hypotheses and associated confidence levels for issues that the student in question may be suffering from. It presents this information – its hypothesis, confidence level, factors under consideration (when possible), and suggested solution – to guidance advisers to evaluate before meeting with students. An adviser meets with the student in person and afterwards, now armed with a clear understanding of the student's issues, feeds this information back to Watson. Were the issues it projected correct, incorrect, or partially correct? What risk factors does the adviser look at when dealing with this issue, and do they differ from the ones that Watson considered? What other issues did the adviser discover that Watson missed? Was the suggested solution the correct one in this case, and if not, what was the better solution?

This is Watson's training procedure – even as the system learns, the advisement process is optimized in situ. Initially Watson will operate only in a secondary capacity, due to its limitations, but as it goes through its cycles and becomes more accurate in the results it serves, it can take on a more active role. There are likely to always be unusual combinations of issues which require cooperation between advisers and Watson to resolve, and there will always be issues, like major decisions and mental stability checks, that require an adviser's input. But once Watson comes to a full understanding of more minor and less nuanced issues, it can take over resolving them with minimal overview from the advisers, or even entirely by itself. To help achieve this, we introduce the second element of the Watson system: the student one.

Students can make use of Watson's understanding of school procedures and their own student profiles by asking the system, through an online application, what Watson has to say about their student profile. At the same time Watson can work in reverse: having detected the issue, or having been queried by the user or by an adviser, it can initiate contact with the student and present the now-standardized solution. If the student believes that they have a different issue, they can inform Watson and ask the system to tell them what it thinks they should do; Watson will serve answers when it is confident that its solution is the right one and advise the student to see their adviser when it is not. By streamlining smaller-issue interactions between students and their advisers in this manner, Watson will free up advisers to focus on major issues that are more complicated to resolve: principally, on retaining at-risk students.

This is the most important issue that advisers need to face, but that they are presently barely able to. Watson can check the student's profile against risk factors such as falling below full-time status, account holds, and GPA problems to estimate how likely a student is to fall into

the 67% who do not graduate within four years. After Watson is sufficiently certain of the issue, it will notify the student's adviser and place the student into a prioritized queue, allowing the adviser to start their work with a clear understanding of the problem already at hand.

It may at first seem that implementing a Watson-based system would be prohibitively expensive – after all, CUNYFirst cost CUNY more than 600 million dollars. However, this system is less spendthrift than it may at first appear to be. IBM already has experience creating a number of similar systems: implementing a Watson-based academic adviser would simply require retrofitting old ideas to fit a new theme. The implementation of Watson at Sloan Kettering to a large extent parallels the technical aspects of our proposed system. Academic problems can be imagined as “diseases,” signals as “symptoms,” hypotheses as “diagnoses,” and procedures as “treatments.” Watson would use very similar procedures to understand and evaluate student profiles, much as it does medical histories at Sloan Kettering, allowing us to piggyback on research that IBM has already completed – the necessary research comes down to customizing the system so that it can work for faculty and students instead of for doctors and patients. And unlike, say, CUNYFirst, Watson will have an immediate financial impact, through the knock-on effects that student happiness, retention, and ultimately, rankings, have on the college's financial environment, and through the greater focus that it will allow advisers to have on students that “slip through the cracks”.

We believe that the system we have presented here is a significant business opportunity for both Baruch and IBM. Baruch gains a system that would allow it to better handle its student volume, address recurring issues, and increase the quality and quantity of the college's enrollment. For IBM, this endeavor presents a great opportunity to test the project. There isn't a more perfect place to implement the system: the combination of factors we have outlined make Baruch's advisement problem particularly acute, and thus our proposal particularly actionable and the outcomes particularly rewarding. IBM also gets first crack at the market: though we exclusively refer to Baruch in this analysis, once it is out of initial trial runs our Watson-based advisement system can be generalized to the entire CUNY system, and from there, to any large university in the United States (and ultimately, the world). So we ask you to help us help Watson make college more human.