

Actuarially Academic

By

Kathryn Brickin looked out at a classroom full of attractive, well dressed students hanging their professor's every word. Then suddenly, the room faded to black.

"Hologram University has the potential to simulate virtually every aspect of the college classroom experience at a fraction of the cost of a traditional brick and mortar university", said Edward Xavier, president of Hologram University. "Not only can students pause and resume the professor's lectures to ask questions, but they can also choose to sit next to a hologram of any student who has taken the class previously."

"So that they can better hear questions asked by other students?" asked Kathryn, a real estate agent who was trying to comply with the zoning regulations.

"Well, that could be one reason," answered Edward. "but it also plans to partner with social networking sites and local athletic clubs for the purpose of replicating the social and recreational aspects of college life. Oh sure, attendance, homework tests and labs would be difficult to track, making them highly susceptible to fraudulent behavior, just like at a brick and mortar university, and for a fraction of the cost. Hologram University, it's the wave or particle, if you prefer, of the future."

"So, are you claiming that this could turn our university system into, if you will, a shadow of its current self?" exclaimed Kathryn.

In the future, everyone will be required to take an improvisational comedy course.

"Yes," replied Edward, "one might say that existing brick and mortar universities will become, if I may, virtually redundant."

Was it all a dream? Well considering that Kathryn's sister, Dr. Sara Brickin was a professor at the nearby college, Terrestrial University (TU), it was more like a nightmare.

In 2040, higher education was responsible for approximately 10% of each state's budget, but tuition costs were still rising at a rate well beyond inflation. This caused some students to gravitate towards trade schools and the military, in addition to entering the work force straight out of high school. The last path was beginning to include an increasing number of lucrative career paths such as dental hygienist, air conditioner repair, actuary, and para-actuary, as well as the opportunity for deferred education. And deferred education included study at brick and mortar universities, online education, and self-study via online options. And now, Hologram University was offering the experience of a brick and mortar university at the cost of an online education, with the flexibility of self-study.

But, Kathryn had an ace up her sleeve.

"The rent for this unit would be \$1 Million per month", computed Kathryn.

“Well, that’s a bit more than I was expecting”, answered Edward, “but you do realize that I can get a better price somewhere else,” said Edward

“Be my guest,” said Kathryn.

“Hey, don’t guests usually stay for free?” replied Edward.

“Yes, but they also leave when they are told,” said Kathryn.

“Well then, I will show myself out,” said Edward.

Kathryn then called her sister Sara and told her about Hologram University.

“This could end brick and mortar universities as we know them!” said Sara

“I’m not sure I would go to that extreme,” replied Kathryn.

“Students are paying more in tuition, taking longer to graduate, and finding it harder to get jobs when they do graduate,” replied Sara. “If online universities can provide comparable social interaction, my employer could become obsolete.”

“Well, is there some way to increase graduation rates and graduation speed?” asked Kathryn.

“Do you mean with extra tutoring?” asked Sara.

“If that’s what you want to call it, fine,” replied Kathryn.

And Sara did what she could. But these issues faced brick and mortar universities all across the country. Various attempts were made at solutions over the next 5 years with even more variable results. And the glut of unqualified graduates caused them have both more difficulty in finding a job after graduation as well as more difficulty in performing their jobs once they got hired. The universities were also affected as their reputations began to suffer. And, more importantly to them, so did their revenues.

Next, brick and mortar universities removed all free online content, which they believed may have been cannibalizing their paid online business, as well as on campus enrollment.

But, this just opened the door for freelance professors to pick up the slack. Brick and Mortar universities were still able to distinguish themselves by offering live, in person events, such as musical concerts, live theatre, and intercollegiate athletics, but they were only as strong as the students performing them. And these students were susceptible to the same issues that faced the rest of their respective student bodies.

Back at TU, in the year 2045, one of those students was named Astoria Gordon. She had just failed an English paper, and was teetering on the brink of academic ineligibility to play for the school’s quid ditch team.

“You can’t fail me, I’m the captain of the quid ditch team!” said Astoria to her English Professor, Dr. Peggy Morter.

“Well, Captain Gordon, you may want to change course, because there’s an iceberg in your immediate vicinity,” replied Peggy.

“But, wouldn’t the Titanic have sustained far fewer damages had they simply stayed the course, rather than turning away?” replied Astoria.

“It never should have taken on a faster speed than it could handle,” replied Peggy. “Now, do you really want to try and defend your paper because, quite frankly, everyone in this class is probably dumber for having read it?”

“Well, it was voted the reader’s choice by my classmates,” replied Astoria.

“What part of ‘dumber for having read it’, do you not understand? Besides, wouldn’t your status as captain of the school’s quid ditch team have biased the vote?” answered Peggy.

“Hey, cut me some slack, do you realize how many times I had to re-read it?” replied Astoria.

“Your paper had an extraordinarily convoluted plot, not to mention neglecting most fundamentals of narrative including both setting and character development in favor of some abstract theme,” said Peggy.

“But don’t great minds discuss ideas, average minds discuss events, and small minds discuss people,” replied Astoria.

“Excuse me, but that is out and out plagiarism, unless you can tell me who said it,” replied Peggy.

“I think it was said by a woman” said Astoria.

“Actually, by virtue of Bayes’ theorem, that would probably be sufficient for most multiple choice tests, although the remaining exams would require you to provide the name of Eleanor Roosevelt”, said Peggy.

“And how was I supposed to know what you were looking for in this story anyway?” asked Astoria.

“Well, it might help to show up to class every once and a while,” said Peggy

“Well, that didn’t seem to stop you from coming to my games,” said Astoria.

“Don’t change the subject. Just tell me, why are you here?” asked Peggy.

“Because I need to pass this class,” said Astoria, “If you give me another chance, I can make it worth your while, financially speaking”, answered Astoria.

“I’m going to pretend I didn’t hear that last part. To quote the great inventor Robert Bosch, ‘I would rather lose money than trust’, but why do you even need to pass this class? You’re a great quid ditch player, why not just turn pro right now?”

“Because I’d like to have something to fall back on after I hang up my broom. Besides, with the growing popularity of e-Sports, the role of the quid ditch athlete may soon be reduced to a pregame skills challenge followed by a virtual simulation. Oh sure, it would reduce the risk of injury to everyone involved, but the lengthening of the career spans will totally reduce the number of openings for new players. We have a saying in college quid ditch: the scariest scenario is a season where every active professional quid ditch player becomes unable to play, the second scariest scenario is a season where no active professional quid ditch becomes unable to play.” said Astoria.

“Yes, that’s an excellent point. No one ever plans for that latter scenario,” said Peggy.

“If they use ladders in the skills challenges, it might result in a more sustainable injury rate,” offered Astoria.

“And, if you had come to class when I taught about schadenfreude, you would know the risks of joking about your own benefit at the expense of others. It can turn even the friendliest audience against you in a heartbeat. Look, people do seem to like your writing, flawed though it may be, but there’s always more to learn. I am going to take my lunch now. Just come to class, okay?” said Peggy.

“Okay,” said Astoria.

In the faculty cafeteria, Peggy met up with Sara.

“Can you believe what happened to me today? A student tried to bribe me into allowing her to rewrite a paper!!!”

“Come with me,” said Sara, “There’s something I need to show you.”

“For the last time, I’m not interested in one of your sister’s time shares!” responded Peggy.

“Well, I still think it’s a great investment, but that’s not what this is about,” said Sara.

Sara proceeded to show Peggy something that wasn’t taught at any college: The Society of Actuaries’ (SOA) modules. Their incorporation of partial self-assessment and unlimited on-demand fee-based retakes caused Peggy to re-think her dismissal of Astoria’s bribery proposal, but she was still skeptical.

“This is all well and good, but how much is this all costing the states?” asked Peggy.

“The SOA receives no money from the states, and members of the SOA are not required to have college degrees. However, many universities, both state and non-state supported, do offer curriculum which can assist an actuarial student in passing each of the preliminary exams, although cheaper options are also provided by both the SOA and third party vendors.” replied Sara.

“And, how much is it costing the students?” asked Peggy.

“Based on one sitting per exam, the aggregate tuition costs towards earning membership in the SOA are less than those of 2 years at a community college, and an FSA would cost less than 4 years at a community college”, replied Sara.

“But, what kind of jobs are these actuaries getting?” asked Peggy.

“The median salary for a member of the Society of Actuaries is higher than that for someone with a master’s degree in the comparable fields of Mathematics or Statistics, and most employers will reimburse employees for the relatively low tuition costs as well as those for books and study materials”, answered Sara.

“Wait, actuaries can have paying jobs while they’re taking exams?” asked Peggy.

“Yes,” said Sara, “but we’re getting off track here. My main point was to show you about their structure of self-assessment grading and unlimited on demand retakes. I think you and Astoria may be able to work something out.”

“Okay,” said Peggy, “but how much should I charge? I want to help students who are sincere, but I don’t want to open up the floodgates.”

“Well,” said Sara, “you could multiply the course’s tuition by the fraction of the grade that the paper represents, or you could think about the marginal cost to you in terms of time, and then multiply that by your computed hourly wage. You might be able to farm it out to a teaching assistant (TA), but make sure they’re qualified to do the work, and that they perform the service with competence and care. Also, try to avoid TA’s with conflicts of interest, keep all communication clear and appropriate and to the intended recipient in an appropriate and timely fashion, and make sure not to disclose any confidential information. Also, try to avoid advertising of any kind, and always use proper titles and designations.”

“Those sound like really appropriate guidelines,” said Peggy.

Sara continued, “Another option could be to have the students do volunteer work for the University in lieu of payment.”

Peggy disagreed, “I’m not sure that would be a good idea in Astoria’s case. She also proposed forcing all professional quid ditch players to climb ladders in order to increase the number of openings when she graduates. She was concerned that the sport was becoming too safe.”

“Well,” said Sara, “that would definitely fall under conflicts of interest. But, she has already offered to pay cash, so I think you should be okay. Now, the school’s soccer, squash, and swimming squads have stunk this season, but the summation of this season’s school’s sports squads can still be salvaged. The next step is to signal Astoria’s cell phone, and see if you can save the school’s quid ditch season.”

“Certainly,” said Peggy.

Peggy went back to her office to compute her initial counteroffer. She then presented the idea to her superiors, got the proper permission, and told Astoria, who agreed to her counteroffer and went off to rewrite her paper. But there were a few things that still bothered her.

If Sara had such confidence in this idea, why had she not just implemented it herself? And, why didn't she want to use the university's wifi on her tablet? And, how could she afford the data plan on said tablet? And, why was she so quick to just accept Peggy's denial to the time? Was it due to Sara's seemingly newly found aversion to advertising? Peggy made another call, but it was not to Sara...

The next day, following Peggy's call, the Terrestrial University Very Wise Cross (X) us & You're Zilch (TUVWXYZ) committee requested a meeting with Sara.

"Do you know why we called you in here?" asked Teresa Terrestrial, the Chair of the TUVWXYZ committee.

"Is it to congratulate me on the high GPA, graduation & job placement rates, and median incomes of my students, compared to the rest of the University?" replied Sara.

"Actually, we were wondering if you could elaborate on how you've achieved these milestones, and why none of your tactics were disclosed to the University. If you needed extra cash, why not just use that mobile application? ", asked Uma Terrestrial, the committee's vice chair.

"You know, the mobile app that exploits the rounding discrepancies between that popular spreadsheet program and that popular database program, both of which are made by the same company and are even bundled together," suggested Veronica Terrestrial,

"The spreadsheet always rounds up values ending in "5" while the database applies the even-odd rule, so the spreadsheet is often higher and never lower," interjected Wanda Terrestrial, "there's potential to make some real money."

"Well," replied Sara, "ever since all of the top companies to which that app targets started paying living wages, provided safe working conditions and adequate healthcare coverage, and reduced their carbon footprints to internationally accepted levels, they really earned my trust, and taking their money just didn't feel right." Sara continued "And, as for my 'tactics', I wasn't aware that additional assistance to my students needed to be disclosed. Fundamentally, how is this any difference from the students paying for extra tutoring?"

Sara's exam grading model appears in the appendix

"And, what about the students who need multiple retakes? The fees could potentially add up? Do you have anything to say for yourself?" asked Xandra Terrestrial.

Sara walked towards the door, and said "Not at this time, but I can point you to someone who does." Then, she opened the door, and in walked Kathryn Brickin.

“Well, what I have to say is not nearly as important as what you have to say, and I hope that word is ‘yes,’” said Kathryn. “ Now, I see that you’ve taken the first step by implementing my sister’s highly successful exam retake policy, and I hear your concerns about potential costs to students in catastrophic cases. Now, fortunately for you there exists a dataset of experience on this very issue, and the collector and maintainer of that data set is in this very room. And she is willing to help you set up an insurance program to protect your students from the very issue that was just described. Now, she’s set up an elaborate formula using the current period’s course load, adjusted for professors of course, extracurricular commitments, and a credibility weighted mix of prior utilization and a risk adjusted GPA...”

“Look, just because we made an exception for a star athlete doesn’t mean we’ve implemented an entire new policy. And, it definitely doesn’t mean we need to give additional money to someone we were in the process of disciplining,” said Yelena Terrestrial. “In fact, you have yet to define the problem to which you claim that your product is solving,”

“I AM THE PROBLEM!!!” interrupted Kathryn.

“You can say that again,” joked Zoey Terrestrial.

“I AM THE PROBLEM!!!” repeated Kathryn.

“Very funny, but I’m not sure I follow,” said Teresa Terrestrial.

Just then, there was another knock at the door. Sara answered it, and in walked, Kathryn Brickin?

“Hey, I don’t think I can follow her either,” said Kathryn. “I mean, she’s articulate, prepared, and has hair to die for. You could say she’s the wave of the future. You could also say she’s a particle, because she’s nothing more than a beam of light.”

Sara then pressed a button on the tiny remote control that she was holding in her hand, and the original Kathryn, which was actually a hologram, disappeared.

Human Kathryn continued. “What you’re currently witnessing is the live version of me trying to compete with a heavily edited video avatar, and let me tell you, it’s not easy. My avatar can travel with you anywhere, always speaks at an appropriate volume, and can rewind, pause, or fast forward at the discretion of any of his students. Now, while all of you have been waiting for the sequel to that 2009 film, the real thing has been created, and she can be anything you like, including one heck of a virtual professor.”

Uma Terrestrial asked “But what about-”

“Frequently asked questions?” Interrupted Kathryn, “A voice activated feature can pause the lecture, answer any question that appears in the FAQ section, and immediately resume from where it left off. Additionally, students will be allowed the option to be ‘seated’ adjacent to as many as 4 other students

who have previously sat for the current lecture. Students can hear all of their questions, and with enough lead time, hear all of those answers.”

“But, what about the infrequently asked questions?” asked Victoria Terrestrial, “And, what about students that do not get their questions answered in time for the test?”

“It would sure be nice if they could grade their own tests along with their professors, take the lower grade, and retake the test if necessary,” responded Kathryn, “but that doesn’t really seem practical in the astronomically high student to faculty ratio to which hologram me is capable of. Look, the students are the customers, and they deserve more than just a high passing rate. They deserve more focused, individual, attention, especially when they’re able to narrow down the specific areas in which they need additional assistance. Someone needs to meet them half way. And, anyone suspected of foul play would, of course, be subject to referral to the TUVWXYZ.”

“Alright, the solution addresses the problem and the results have so far been favorable, but what makes Dr. Brickin qualified to implement this new insurance plan, other than having access to a large dataset?” asked Wanda Terrestrial.

“Well”, replied Kathryn “let me introduce you to one of the newest members of both the Society of Actuaries and the American Academy of Actuaries, Dr. Sara Brickin, ASA, MAAA.”

“Well, you’ve definitely convinced the people in this room” said Xandra. “We will put in a good word for you with the other committees on which we serve. But, I still have one more question. Why would you offer to rescue us after we nearly tried to fire you?”

Sara answered, “Because we need each other. The future is coming whether we like it or not. If we don’t work together to protect our niche, there’s a risk that the whole situation becomes, if you will, virtually academic.”

Appendix – The Exam Grading Model

| Define the Problem | Design the Solution | Define the Model | Monitor the Results |
|--|----------------------------|--|--|
| Students take too long to graduate | Offer instant exam retakes | <ol style="list-style-type: none"> 1. Students would grade their own examinations against a predetermined answer key, and initially receive the lower of their grade or the instructor's grade. 2. If the student's grade was lower than or equal to the instructor's, they could receive a re-test, free of charge, with only material that was on the test, and could not be penalized for missing class during that unit. 3. If the student's grade was higher than the instructor's, the student could still retest for a fee, but the retest could cover any material in the unit, and attendance penalties would apply. | <ol style="list-style-type: none"> 1. The majority of full time college students graduate within 4 years 2. Lower income students were offered the option of working off their retake fees 3. Insurance plans were offered with riders to include property damage resulting from sports-related celebratory rioting |
| Students are unprepared for the work force once they do graduate | Remove all curved grades | <ol style="list-style-type: none"> 4. In lieu of a fee, some students may be able to perform services to the university, generally in hard-to-fill jobs. | 90% of college graduates seeking full time employment find it within 6 months and remain with their employers for at least 12 months. |