NASPAA Student Simulation Competition: Reforming the U.S. Health Care System Within a Simulated Environment

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ABSTRACT

In 2014, NASPAA (Network of Schools of Public Policy, Affairs, and Administration) partnered with the Rippel Foundation to hold the first NASPAA Student Simulation Competition, built on the ReThink Health simulation platform. The competition took place at five sites and involved 181 graduate students from 93 institutions. Students used the simulator in small teams to craft long-term policy solutions to problems facing the U.S. health care system. This article describes how the competition came to be, identifies key stakeholders, describes the environment that made the competition a reality, explains the simulation model, details the planning and logistics for each competition site, lists the materials that turned the simulation into a learning experience, and speculates about implications of this competition and the role for simulation-based exercises in public management and public policy education.

KEYWORDS

Simulation-based learning environment, system dynamics, health care, decision making

SIMULATIONS IN THE PUBLIC ADMINISTRATION CURRICULUM

On January 15, 2009, US Airways flight 1549 lost all power during takeoff from New York City's LaGuardia airport due to multiple bird strikes.[1] Captain Chesley "Sully" Sullenberger is credited with saving the lives of all 155 occupants because of his execution of a near-

perfect landing on the Hudson River. All passengers and crew members were rescued by nearby watercraft as the aircraft sank. Captain Sully was a national hero. The backstory to this amazing feat is intimately involved with computer simulation models, demonstrating the importance of simulation-based learning and its dramatic impact on decision making and professional performance. As a standard component of safety training, commercial airline pilots are required to regularly take simulated aircraft through emergency drills, such as an emergency water landing with the loss of all power. Undoubtedly, several times before the real emergency, Captain Sully had crashed a simulated aircraft as he was learning how to handle the Airbus A320 plane. Sully was likely able to achieve extraordinary performance under real circumstances because he had practiced and learned so much within a simulated environment.

Simulations in the Master of Public Administration (MPA) and Master of Public Policy (MPP) curriculum offer our students a similar opportunity. Students can learn how to successfully manage complex problems in the public sector within a simulated environment, often experiencing failed policy initiatives before they learn how to get it right (Ku, Deegan, MacDonald, Andersen,& Andersen, 2016). This article explores one effort to bring the potential and promise of simulation-based learning into the MPA and MPP curriculum. In 2015, NASPAA (Network of Schools of Public Policy, Affairs, and Administration) partnered with Rippel Foundation to hold the first NASPAA Student Simulation Competition, built on the ReThink Health simulation platform. The competition took place at five sites and involved 181 graduate students from 93 institutions. Students worked with the simulator in small teams to craft long-term policy solutions to complex problems facing the U.S. health care system. In this article, we explore how NASPAA's national simulation exercise came to be, how it was executed, and what the potential may be for such simulation-based learning exercises in the MPA and MPP curriculum.

Of course, airline manufacturers did not invent the notion of simulation-based learning. Such learning has a long and proud history. Indeed, the Prussian army is credited with having devised, in the early part of the nineteenth century, formal war games (*Kriegsspiel*) to overcome the limitations of the classroom in teaching about the messiness of war (Burenheide, 2007; Perla, 1990). Simulations, as board games and as actual practice in the field with live ammunition, are a staple of war colleges' attempts to teach officers and enlisted soldiers about military strategy and tactics. One principle of using simulations in the classroom is that the simulated environment can mimic the sequential nature of decision making, in which future decisions are constrained by previous decisions (Desai, 2012). While simulations can and do occur as board games, role-play exercises, and group activities based on case studies, NASPAA's work with simulations involves computer-based models. By definition, when such simulations enter the classroom they require a level of computing technology to function.

Tactical decision games (TDGs) have been used to teach about intangibles such as leadership, how to assess situations, identify a course of action, and communicate decisions (Wildland Fire Lessons Learned Center, 2011) as well as concrete topics such as the bullwhip effect in supply chains (Sterman, 1989). Simulations are particularly useful in teaching about complex public policy problems that exhibit nonlinearities, feedback, dynamic interactions, and interdependencies that cannot be readily captured in simple linear equations (Epstein, 2007; Gilbert & Conte, 1995; Gilbert & Troitzsch, 1999; Selia, Ceric, & Tadikamalla, 2003; Taber & Timpone, 1996; Zacharias, MacMillan, & Van Hemel, 2008).

Simulation-based policy and management analysis as a way to approach complex problems (Colander & Kupers, 2014) is increasingly finding its way into the practice of public administration and policy (Ghaffarzadegan & Andersen, 2012; Kim, MacDonald, & Andersen, 2013; Zagonel, Rohrbaugh, Richardson, & Andersen, 2004). Similarly, educators in MPA

and MPP programs have been exploring ways to integrate simulations into pedagogy (Andersen et al., 2006; Comfort & Wukich, 2013; Deegan et al. 2014; Hu et al., 2012; Ku et al., 2016) using approaches and techniques that are becoming common in general management teaching and learning (Salas, Wildman, & Piccolo, 2009; Sterman, 1994; Swaak, van Joolingen, & de Jong, 1998) as well as medical training (Kunkler, 2006; Sterman, 2006) and military training (Hays, Jacobs, Prince, & Salas, 1992; Salas, Bowers, & Rhodenizer, 1998; Taylog & Barnett, 2012).

CREATING THE NASPAA STUDENT SIMULATION COMPETITION

NASPAA is the international membership association of more than 300 graduate schools of public policy, affairs, and administration. The organization promotes excellence in education and training in public service as well as the ideal of public service. Annually, approximately 30,000 students are enrolled in NASPAA schools, and, after graduation, they go on to serve in the government sector, nonprofit sector, and elsewhere. Across all NASPAA schools, there are approximately 4,000 faculty members with expertise ranging from specific policy areas to administration and management. Public service education is a smaller field than business or law education, and NASPAA students are different because of their desire to work in the public sector and serve the public.

NASPAA had three main goals in establishing a competition: to emphasize the usefulness and transformative potential of a graduate degree in public service, to increase student learning and engagement, and to showcase student excellence by highlighting participants' critical thinking, leadership, and collaborative decision-making skills. Students have multiple options for postbaccalaureate study, and many are not aware of graduate degrees in public policy or public administration. Further, many students are not aware of the skills they could obtain with an MPA or MPP; the Master of Business Administration (MBA) and Juris Doctor (JD) are more widely recognized degrees. But competitions can be one way to raise brand identity and awareness of a public service degree. NASPAA, as an accreditor of MPA and MPP programs, also has a stake in raising the quality of pedagogy and instruction at its member schools. Contextual learning, including simulation learning, has received considerable attention in the academic literature as a means of improving quality and learning outcomes in higher education (Harvard Business School Publishing, n.d.; Sterman, 2014a; Sterman, 2014b). However, the efficacy of simulation—along with that of lectures, case studies, flipped classrooms, and other teaching methods—remains to be proven. NASPAA has long sought to enhance graduate schools' use of contextual learning through internships, hands-on learning, and cases, and simulations are a recent expansion of this approach.

Additionally, NASPAA had specific expectations for the competition. First was to advance pedagogy at NASPAA member schools by providing each the opportunity to send student participants and by offering faculty the use of the simulation in their classrooms after the event. Second, NASPAA hoped that students would be engaged through the excitement and challenge of competition and thus begin building the skills and confidence to tackle complex public problems. Finally, NASPAA hoped that publicizing the competence and academic training of public service graduates would encourage both employers to hire these students and future students to consider an MPA/MPP degree for their postbaccalaureate study.

To achieve these goals and expectations, NASPAA chose a simulation over other competition formats such as case competitions or projects. Simulations offer several practical advantages, including a faster and more intensive event, but more importantly, a host of conceptual and theoretical advantages. A simulation is a powerful decision-making tool that provides a means of quickly testing alternate policy approaches, of taking big actions and seeing big impacts (positive or negative), and of promoting public service values by enabling students to consider intergenerational and long-term impacts of policy and management decisions.

Additionally, a simulation was well suited for a one-day immersive competition that placed students against time constraints and competitive pressure. The world of public service is rife with scarce time and resources; a simulation in a contest format is a fun and powerful introduction to that reality.

Upon further discussion, a few important tenets emerged that shaped the structure of the competition. First, students should be able to easily access the competition without depending on their university's resources, whether financial or personnel; students could thus compete individually, without need of a team or coach. Second, faculty members, who have many competing demands for their time, should not have to spend additional time coaching or preparing students; this led to a competition that required minimal preparation. Third, the competition should complement classroom learning and be minimally disruptive to other curricular events, which meant that the competition would occur in one day on a weekend. The final important decision was the effort to showcase the collaborative nature of public sector problem resolution. Hence, the competition's planners created teams each composed of students from different universities. Given all these constraints and desiderata, the format that emerged was a one-day competition held at multiple, easily accessible sites where multi-university teams would compete to solve a complex and grand challenge.

Challenges where students compete to demonstrate their problem-solving skills are fairly common. The standard format is to provide a case study that purportedly mirrors a generic but realistic problem situation requiring managerial, organizational, and policy skills to address. In this competition, NASPAA wanted to challenge students intellectually in addition to exposing them to a decision-making tool not readily available in most public service education curricula. The competition problem thus needed to offer sufficient complexity and have national attention. The U.S. health care system offered this complexity, and NASPAA was aware of a sophisticated simulation model, the ReThink Health Model, that mimicked the issues a community would encounter as it adjusted to the Affordable Care Act of 2010. Additionally, this model was in use in a course at the Rockefeller College of Public Affairs and Policy at the University at Albany, SUNY. This course focused on helping students learn how systems thinking can address complex problems in which changing dynamics and feedback are essential characteristics.

In November 2014, with the competition structure and topic in focus, a steering group wrote a case that mimicked how a state health commissioner's office would implement health care reform. The simulation model would show in real time the implications of the commissioner's decision during the next 25 years, and students could test potential scenarios before determining the best solution. The competition was thus created as a case study and an accompanying computer simulation, which created a rich learning environment with a competitive element.

EVOLUTION OF THE RETHINK HEALTH MODEL

The backbone of the competition was the ReThink Health simulator. This is a highly complex, data-rich system dynamics model that is used regionally to help align local stakeholders around effective policies to improve the health system. Heavy facilitation had typically been necessary to explain the model; however, for the NASPAA competition, the model was adapted for use in a low-facilitation environment.

The ReThink Health Model was developed beginning in 2007 by the Fannie E. Rippel Foundation of Morristown, New Jersey, and a group of influential decision makers from the health care, business, politics, and energy sectors. In addition to extensive discussions, studies, and consideration of multiple scenarios for the U.S. health care system, the group learned of a simulation model in 2009 called HealthBound, developed for the Centers for Disease Control and Prevention (CDC). HealthBound, a system dynamics (SD) model of the U.S. population and its health and health care, built on earlier community-level models developed in the

1990s and chronic illness models that emerged in the early 2000s. It was created to help the public better understand the need for including "upstream" prevention efforts in national health reform. HealthBound illustrated the potential for using simulation models as a tool for guiding and promoting health reform.

The Rippel Foundation subsequently decided to focus its ReThink Health Model on local health reform and on developing the tools for communities to use in their reform efforts. The foundation considered an SD simulation model to be a key element. Such a model would enable communities to envision the effects of various reform initiatives and build strategies around those efforts most likely to yield the greatest improvements. The foundation created the first version of the ReThink Health Model in collaboration with a group in Pueblo, Colorado, a community facing the real challenges of local health reform. Pueblo had joined the Institute for Healthcare Improvement's Triple Aim program and needed a way of evaluating alternatives for achieving the program's objectives of better health, health care, and lower cost.

The ReThink Health team worked with a Pueblo steering committee in 2010 and designed a model to assist local communities with their reform efforts, balancing local concerns with more generic considerations that would make the model useful to many other communities. Staff, supported by the Kaiser Health Plan in Colorado, helped to assemble data from a variety of sources, such as the Colorado Department of Public Health and Environment and the Colorado Health Institute. Additional data were drawn from the CDC's National Center for Health Statistics. An interface developed by Forio enabled the people in Pueblo to use the model themselves, run a number of simulations with different combinations of initiatives, and observe the combined impacts. What they learned from using the model became the basis for a strategic plan. Pueblo is currently working with ReThink Health to update the model so that it continues to guide the community's efforts.

The model developed in Pueblo and elaborated extensively since then represents the population of a region, disaggregated into multiple groups differentiated by age, income, and insurance coverage. The health status and risks of each of those groups is represented along with their utilization of the region's health care system and the cost of that utilization. Simulations project likely trajectories of health status, costs, and other key variables as various initiatives are implemented. Initiatives available to users include ones that help reduce cost (such as the coordination of care), to streamline care delivery and make its quality more consistent, and to help reduce behavioral and other health risks.

More implementations followed in other metropolitan areas, such as Atlanta and Cincinnati, using local data . Each use of the model brought incremental improvements as well as additional learning about the needs of local communities. In its most successful implementations, the model became a nexus around which stakeholders with diverse interests could meet and develop mutually acceptable strategies for moving their region toward better health, health care, and lower cost.

After several such implementations, an "Anytown" version was developed to represent a hypothetical community with one-thousandth the population of the United States (beginning with 280,000 in year 2000 and rising to 400,000 by year 2040) and with average US characteristics for health status, health risks, and health care utilization and costs. An elaborate interface makes the model accessible to a wide range of users. The interface presents users with many options for creating change in the simulated health system and tools for viewing and understanding the output of simulations.

Scores of civic and professional groups have used this Anytown version to better understand the dynamics of local health reform and the character of effective reform strategies. Students in public health and public administration programs have also used the model to understand the complex systems they will be dealing with when they join the workforce.

This track record made the ReThink Health Model ideal for the NASPAA competition.

REVISING THE SIMULATOR FOR THE COMPETITION

Working with NASPAA, the ReThink Health team made a number of modifications to its simulator to make it easier to use in NASPAA's low-facilitation competition format. There were three primary modifications: creating a Super Score function, embedding diagnostics, and adding shortcuts in order to view stakeholder concerns.

Creating the Super Score Function

During the competition, students and judges had minimal time to complete their tasks. To select a winning team in less than one hour of judge discussion time, it was crucial that one element of the final score be a quantitative assessment of how well each team's solution performed, as determined by the simulator. This assessment became known as the Super Score, and it measured five important health system metrics (costs, death rate, quality of care, inequity, and employee productivity) that were consolidated and normalized into a single number. The result was a single quantitative score for each team and the ability to compare proposals within sites and across the nation. This Super Score also clearly indicated team progress toward possible system improvement. Each metric had a maximum score of 100, but it was impossible to concurrently score 100 on each metric. The maximum possible Super Score was in the high 300s. Figure 1 is a screenshot of Super Scores collected from one competition site.

Embedding Diagnostics

Each competition site had a technical leader who had undergone basic training in the model. These people were familiar with the model but did not have an in-depth understanding of health care or systems dynamics. This latter knowledge, typically present in the person who facilitates the model experience in a community setting, would be crucial for students to have so that they could understand the simulation results and make improvements for future iterations. Diagnostics were thus embedded

FIGURE 1.
Screenshot of Super Scores From One NASPAA Competition Site

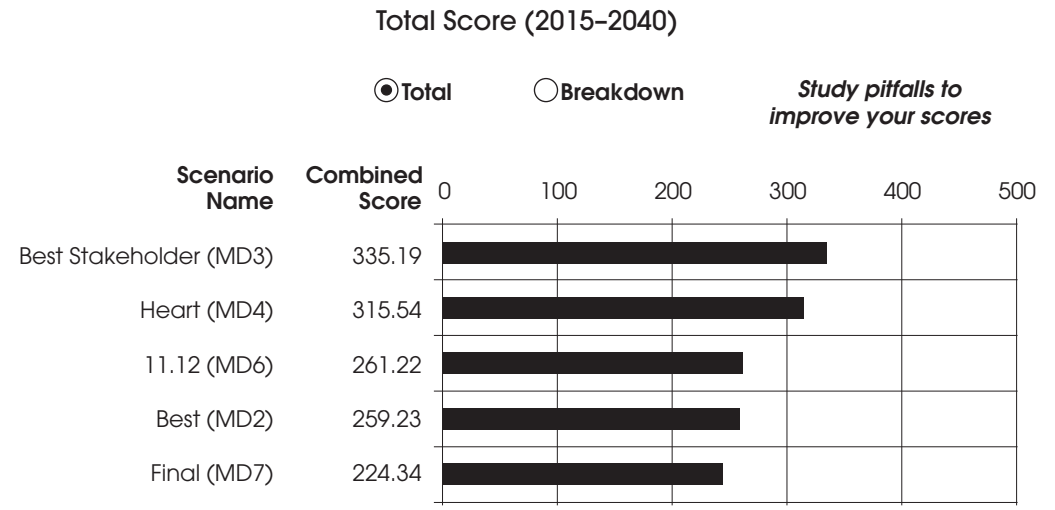
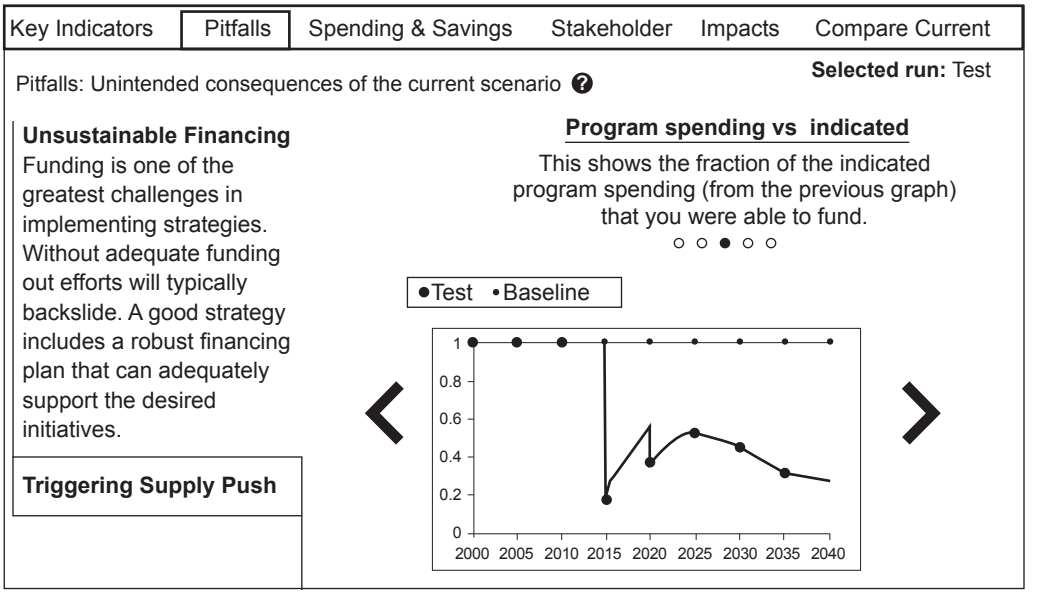


FIGURE 2.
Screenshot of One Diagnostic: The Pitfalls Tab



into the model's user interface to help students understand the unintended consequences of their proposed strategies, as shown in Figure 2. The simulator flagged typical consequences, such as unsustainable financing because of overambitious efforts and the triggering of unnecessary specialist procedures due to falling income after cost-cutting efforts. The model displayed a graphical story of causality that provided guidance on how to improve the Super Score by thinking both systemically and strategically about how combinations of initiatives could be complementary. In addition to easing the load on the competition's technical leaders, this diagnostic feature helped reduce the natural tendency to game the system, instead encouraging users to be more thoughtful in their simulated proposals.

Making Stakeholder Concerns Visible

While health care was the focus of the competition, most students did not have extensive health care policy backgrounds. Students did know that to implement lasting policy change, regardless of the specific area, they needed to have buy-in from stakeholders. The competition simulation thus needed to identify key stakeholders and what was most important to them, in the same way that local communities currently use the model. In the final task during the competition, students were asked to role-play as public health officials, hospital administrators, medical specialists, and health insurance companies to ensure that the competition was more than just an analytical exercise. Students were forced to contemplate the practical realities and implementation challenges of bringing their proposal to reality. Using a menu for stakeholders built into the model and metrics of concern to the various stakeholders (represented in behavior charts over time), students could discuss real-world implementation issues faced by local policy makers. Teams were thus able to propose compromises and quickly modify and test their proposals to address some of these stakeholder concerns.

COMPETITION ACTIVITIES AND LOGISTICS

While the competition's conceptual development took place over a few years, planning for the actual day of the competition began in September 2014, six months prior to the event. Because of the scale of the competition across multiple sites, planning and logistics were vital to success. Implementing a simulation in a classroom at a single site, by comparison, would not require as much planning. Figure 3 summarizes the logistical milestones for the event.

FIGURE 3.
Logistical Milestones for the Competition

6 Months Prior to Event

- Select date for the competition to maximize student participation.
- Select six sites to reflect geographic diversity.
- Sign memorandum of understanding with each site defining full range of logistics.
- Kick-off meeting for all key stakeholders to set framework for overall competition.

3 Months Prior to Event

- Create a competition website (studentcompetition.naspaa.org).
- Initiate student recruitment via intensive outreach to all NASPAA member schools.
- Identify three qualified judges for each of the selected sites.
- Complete 12 hours of online training for all judges.

1.5 Months Prior to Event

- Principal representatives at NASPAA member schools nominate students for participation.
- Register participating students (234 registered).
- Create supporting material for competition, including instructions and worksheets to support all tasks, PowerPoint templates for final student presentations, judging rubrics, short videos to be shown at all sites on day of competition, and student self-tests of readiness for all tasks.
- Create supporting materials for judges, including rubrics for evaluation, guiding questions to ask each team during the day, and suggested choreography for judge activities throughout the day of competition.
- Create supporting materials for simulation leader at each site, including a PowerPoint that will be visible at a central area all day and a "run-of-show" document detailing minute-by-minute competition activities.
- Initiate e-mail contact with all students, including an acceptance e-mail, assignment of team members and link to pre-test, and detailed information about the case and instructions on how to prepare for the competition.

The day of the event, Saturday, February 28, was broadly organized around four tasks that each three-person student team completed:

- **Task 1: Designing a first policy package without use of the simulator.** Students arrived at 8:00 a.m. and teams began creating a first-cut policy package to reform the health care system in Anytown. Teams were given material on various policy options and asked to put together a policy package not using the simulator. At the end of this task, each team typed this first set of policies into the simulator to see how it performed in terms of the five major criteria and the machine-computed Super Score. This was the team's Base Run.

- **Task 2: Revising and updating the policy package using the simulator.** Teams then viewed a short video instructing them in the technical details of running the simulator and then began revising their Base Run policy packages to improve performance according to the five criteria. During this task, teams were able to access online diagnostics describing why a policy might not be working as expected as well as to examine select variables important to key stakeholders named in the case.

- **Task 3: Creating an implementation approach and presentation.** This task challenged students to think through implementation of their policy packages from the point of view of key stakeholders described in the case. Each team modified their policy package to make it more acceptable to these stakeholders and then prepared a PowerPoint show describing their final set of policies and discussed how the stakeholders would react.

- **Task 4: Presentation of team results to judges and peers.** The day ended with all teams making final presentations to their peers and the judges. Judges used evaluations recorded during the day to select a regional winning team.

Immediately following the selection of regional winners, each winning team's materials were sent to a panel of three super judges, which determined the national winner. The super judges met via phone on Monday, March 2, and the winners were announced the same day. An award was also granted for Best Documented Team Learning. Each team submitted a USB drive of their work to a group of faculty, who used a rubric to determine which team learned the most during the event. Various prizes were awarded to the winning teams, and regional and national winners were announced online and via a NASPAA-generated press release.

PARTICIPANT REACTIONS TO THE COMPETITION

Organizers did not undertake a scientifically rigorous evaluation of the competition (the competition was not designed to systematically collect data), but they did record participant reactions in a number of ways. At one site, the School of Public Policy at the University of Maryland, a videographer created a short documentary account of the day's activities. That video (publicpolicy.umd.edu/newsroom/video/umd-school-public-policy-naspaa-student-simulation-contest) provides a brief and easy-to-access record in the words of both students and judges. One of the judges from this site later summarized his experience:

> I was very impressed by the quality of the experience and the quality of student thinking, especially the level of insights that emerged in a single day. In fact, some of the student insights that emerged during exercises were those that it took me months or years of (sometimes bitter) professional health policy experience. Had I the need and opportunity, I would hire any one of them.

One of the super judges who reviewed the semi-finalists commented in the, narrow race for the national award:

> Students from the winning team made advanced and sophisticated use of the simulation model and all of its capabilities

> in crafting their final policy positions. While the final top two teams that we were considering did not have the highest machine-generated "Super Score," these teams did demonstrate an exemplary understanding of health care reform, policy implementation issues, and a heightened sensitivity to the positions of key stakeholders. I was especially impressed by the way that they carefully sequenced a series of policy actions to insure the viability of long term financing options.

In addition to reactions from the judges, student reactions were solicited using a postevent survey that scored statements using a 5-point Likert scale (5 = strongly agree; 1 = strongly disagree). A total of 91 students responded (63% response rate). Figure 4 summarizes responses to key statements about the competition.

Overall, students strongly agreed that the experience was enjoyable and challenging. They strongly agreed that the simulator helped them understand the complexity inherent in health care as a policy problem and that they would recommend a similar event to faculty in their own schools. Students also enjoyed working in teams and learned from their teammates. Students were in less agreement that the simulator was easy to use, and many students found the day's activities to be tightly scheduled and wished there could have been more time to work on all competition activities. Of all the prepared materials, students found the worksheets and self-tests to be the least useful.

Additionally, 95% of survey respondents said they would recommend that a friend participate in the competition next year, and 85% said they would participate again themselves. In fact, several students who competed in 2015 participated again in the 2016 competition. Students also shared a clear desire to have more simulations used in the classroom—94% would like this.

FIGURE 4.
Student Reaction to Key Statements About the Competition

Survey question evaluating components of NASPAA Student Simulation Competition	Mean Likert score
I enjoyed the Urbis Health Reform case.	4.49
The Urbis Health Reform case was challenging.	4.64
The self-tests of readiness were helpful.	3.60
Each task at the competition was clearly presented.	3.87
The worksheets were useful.	3.61
I enjoyed working with my team.	4.41
I learned from my team members.	4.39
The simulator was easy to use.	3.79
The simulator helped me understand the complexity of policy problems.	4.24
There was sufficient time to accomplish all the tasks.	2.81
The facilitator was helpful.	4.00
Interacting with the judges helped me to learn.	4.05
Overall, I was satisfied with the competition experience.	4.32
I would recommend this event to the faculty at my school.	4.48

The narrative section of the survey asked students what they liked most about the competition. The following comments were typical:

- Interacting with my team members and discussing the problems we were having with the case with them was really great. I also learned a lot about healthcare reform in a very short period of time!
- Using the simulator was very interesting, and I would have liked to have been able to work with it more. We really enjoyed working together on the case, and the judges/facilitator were very friendly and gave some great real-time feedback. I learned so much!
- It was just an incredible opportunity to interact with others in my desired field and work on real and relevant policy issues facing our country. It was a fantastic experience.

When asked how the experience could be improved, students gave responses that reinforced trends that also emerged from the competition's quantitative ratings:

- I wish we had more advanced time to prep. I work full time and attend school, so was unable to review case materials until the night before the simulation after travelling to the competition site.
- I really wish there had been more time to interact with the other teams in a networking setting. If there had been an actual reception after the competition, for example, it might have allowed us to connect more in an informal environ ment. We were so strapped for time when trying to complete the tasks that we were unable to really speak with the other groups at all. Also, the simulator was very complex, and I feel we were not able to use it as fully as we could have because of the minimal amount of training we received beforehand.

CONCLUSIONS AND NEXT STEPS

The NASPAA Student Simulation Competition results were outstanding in a number of dimensions. Overall, NASPAA learned that it could successfully conduct a complex, multisite, simultaneous event to a very high standard and with a high level of participation. Evaluating the competition against its initial goals, NASPAA concluded that the simulation was an extremely effective way of engaging students with public problem solving: 85% of the student participants said they would do it again and 95% would recommend it to their classmates. And, though analysis of student learning is still under way, early results indicate that students did indeed realize the predicted benefits of using a simulation in a public policy/management competition; for example, student presentations referred repeatedly to long-term impacts of their policy decisions, and many teams resorted to significantly different strategies once they took into account the results from their initial simulation runs. Through using the simulation, students also appeared to learn important lessons about systemic and long-term effects of their actions.

NASPAA concluded that the simulation was an excellent means of advancing pedagogy and contextual learning on NASPAA school campuses: more than 100 schools expressed interest in the competition, and many faculty members expressed interest in using the competition simulation in their classrooms. Plans are under way to launch a dissemination project to reach those interested schools.

The simulation competition was so effective in advancing pedagogy and student engagement that NASPAA offered the competition for a second year (in 2016) and is exploring ways to institutionalize long-term support. NASPAA is also working with member schools to implement the ReThink Health experience in their curricula and to measure student learning. We believe that simulation-based learning may fit well within the MPA and MPP curriculum in several diverse formats. For example:

- A simulation could become part of a capstone exercise. Student teams could test their public administration and policy skills in a wide-ranging synthetic exercise.

- As part of an introductory overview, a simulation could help students see the "big picture" at the beginning of a class. It could also support a whole-class introduction to public administration as students embark on their MPA or MPP careers.
- A simulation such as the ReThink Health Model could support classroom exercises and homework assignments in a course on health policy and management. Other simulators could be developed for other policy areas.
- Simulations are ideally suited to teaching generic lessons about how to manage complexity (Ku et al., 2016). As such, simulation-based learning environments could usefully find their way into core classes in MPA and MPP programs.

By creating an inventory of simulation-based exercises first used in the competition, NASPAA hopes to encourage pedagogical experimentation with various modes of use. Simulations in a competition setting proved incredibly fruitful when combined with public policy education, yielding both pedagogical benefits and student learning and promoting public affairs graduate student prowess to a wider public.

NOTE

1 We presented an earlier version of this article at the International System Dynamics Research Conference in Cambridge, Massachusetts, in July 2015.

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APPENDIX

Materials Developed to Support the Competition

The NASPAA Student Simulation Competition was a multifaceted educational experience that involved developing a comprehensive supporting materials for student use. The following materials ensured that students could quickly use the simulation as a tool to facilitate their understanding of health care and the complexities of the policy problem presented:

ReThink Health Dynamics Model

https://forio.com/app/rippel/rethink-health/login.html

Thinking through the complexities of the health system is fraught with difficulties, and new initiatives seem to be short-sighted, fragmented, and unable to alter long-term trends. This tool allowed students to use formal modeling to bring clarity to long-term solutions in order to establish a healthier, more equitable, and more sustainable health system. This model was the backbone of the competition, and all supporting materials were designed so that students could smartly interact with the model. A training version of the full model was created so that students could familiarize themselves with it before the competition. Without a strong model, the competition, and any simulation experience, would not be possible.

The Case Study

https://naspaastudentcompetition.files.wordpress.com/2015/02/2015_simulation_case_final.pdf

Students were presented with a case study depicting a recent graduate in his first job with the Commissioner of Health. He has been asked to work with a local task force to create a local "bottom-up" approach to health care reform. The case included background information to define the scenario and specific tasks to be completed during the day of the competition. The case also included complementary worksheets and appendixes with relevant information. The case was designed so that current MPA/MPP students could see themselves in the scenario, so that it was realistic for their future.

Worksheets

https://naspaastudentcompetition.files.wordpress.com/2015/03/naspaa_worksheets.pdf

Since students had limited time to complete each task, task-specific worksheets were created to help students focus on the most important parts of each task. Students downloaded the worksheets and saved them to a USB drive that was collected at the end of the day. These worksheets identified the main decision points covered during the competition tasks and ensured that students thought about the most important elements of the case. Without the worksheets, students could have spent a lengthy amount of time using the model without coming to any concrete solution. When using a simulation in a nonfacilitated environment, there must be documents and materials to support learning; they stand in for the facilitator, keeping participants thinking about the crucial elements of the problem.

Team Self-Assessments of Readiness

https://naspaastudentcompetition.files.wordpress.com/2015/03/naspaa_self-tests.pdf

Before the start of each competition task, teams tested their their readiness for that task using a provided checklist. The technical leader at each site facilitated a question-and-answer period to ensure that all students had an appropriate base level of knowledge to proceed. This self-testing exercise was collaborative; students were encouraged to help each other learn the simulator rather than to compete. In addition to the worksheets, these self-assessments were crucial to managing the volume of information available in the simulation. They helped students understand what was vital to focus on in the upcoming task.

ReThink Health Model Mechanics Video

https://vimeo.com/118290764

The ReThink Health team created an 18-minute Model Mechanics Video that trained students how to use the simulator. Students were asked to view this video twice before arriving at the competition—once to learn and once to follow along. This in-depth overview provided students with the necessary information to log in and use the model so that they did not start from scratch on the day of the competition. This introduction gave students the language and basic facility they needed to begin the day with required knowledge. This was part of the preparation work that students were asked to complete in the 48 hours before the competition. Without watching this video, students could have been confused when they used the simulator and might have tried to game the system instead of using the model as a learning tool.

Instructional Videos

https://app.box.com/s/x0xc3pm8m5yajeoxnvi29d4iojo3rxcp

Three other videos oriented students to their next required tasks—one video for each of the three subsequent tasks in the case. The initial Model Mechanics Video included some of this information, but the short reminder videos focused students on the exact information they needed for the upcoming tasks. The videos were short—no more than 4 minutes—and they were titled "Overview of Urbis" (the fictional city where the case was set), "Simulator Basics," and "Addressing Stakeholder Concerns." These videos were necessary because the competition was simultaneously carried out across six sites; for use of the simulator in a single classroom, these could be omitted.

Judges' Manual

https://naspaastudentcompetition.files.wordpress.com/2015/03/naspaa-competion-judge-manual.pdf

Judges were required to fairly evaluate each team. While they went through training, judges needed a manual to guide activities during the day. The judges' manual included student tasks, questions to ask teams during each task, and details on determining the final winner. The winning team would be selected using a combination of three factors: the Super Score from the simulation (50%),

the judges' evaluation (35%), and peer evaluation (15%). An Excel formula, detailed in the manual, aided judges in compiling the scores and determining the winner. Judges also interacted with each team (nine total) during each task, and the manual provided a suggested choreography to facilitate this. The manual helped ensure that all teams were judged evenly and that NASPAA could stand behind the criteria used to determine the winner. If the simulator is used in a classroom, the judging criteria needs to be clearly explained, but a full manual may not be necessary.

Judges and Technical Leaders Training Sessions

All judges and technical leaders participated in online trainings to thoroughly learn the model the students would use in the competition. The online trainings detailed the technical requirements of the ReThink Health simulator, including how to use administrator privileges. ReThink Health provided and recorded these sessions. These trainings were completed to ensure both consistency and competence across sites. Having trained judges and technical leaders available during the competition was an important element of the event. These people were prepared to troubleshoot the model if necessary and were on-site experts.

Bibliography for ReThink Health Policy Options

http://libguides.library.albany.edu/NASPAAcompetition

Students were given an extensive bibliography that cited available peer-reviewed research on the various policy options available in the ReThink Health simulator. While not many students referenced these materials, providing them let students know that the model was academically sound and could be trusted.