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Progress in Community Health Partnerships: Research, Education, and Action, Volume 13, Special Issue 2019, pp. 123-130 (Article)

Published by Johns Hopkins University Press

DOI: <https://doi.org/10.1353/cpr.2019.0045>



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Leveraging Digital Platforms to Scale Health Care Workforce Development: The Career 911 Massive Open Online Course

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This work was supported by the Northwestern University Office of the Provost, the Robert H. Lurie Comprehensive Cancer Center, and the National Cancer Institute (Partnerships to Advance Cancer Health Equity grants P20 CA165592, U54CA202995, U54CA202997, and U54CA203000). In addition, this work was supported in part by the National Institutes of Health's National Center for Advancing Translational Sciences, Grant Number UL1TR000150. The sponsors did not participate in the design and conduct of the study; collection, management, analysis, and interpretation of the data; or preparation, review, or approval of the manuscript and the decision to submit the manuscript for publication.

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Submitted 06 September 2018, revised 07 January 2019, accepted 29 January 2019

Abstract

Background: Health care is the fastest growing occupational sector in the United States, but students from low-income and underrepresented minority (URM) backgrounds often lack mentorship and basic information about health care careers and pathways.

Objectives: We developed the Career 911 massive open online course (MOOC) to help students from diverse backgrounds to explore and build career portfolios to enter health-related professions.

Methods: We describe the evolution since 2014 of the Career 911 MOOC and lessons learned.

Results/Lessons Learned: More than 20,000 students have enrolled in Career 911. Career 911 has served as a learning resource for schools and health care pipeline programs. Key lessons learned include cultivating strategic partnerships and

networks, using community engagement efforts to counter technology's potential to exacerbate educational disparities, minimizing disruptions from changes to technology, and optimizing data for program evaluation.

Conclusions: Lessons learned on community engagement to develop a MOOC, and anticipating technology-related challenges and program evaluation needs can guide future work to leverage MOOCs and other digital learning technologies for scaling health care workforce development.

Keywords

Workforce development, health disparities, community-based participatory research, massive open online course, research training, health professions, education technology

Diversity in the health care workforce is necessary to tackle cancer prevention and control for vulnerable populations.¹ A diverse health care workforce can increase minority patients' trust in their medical providers, and improve patient access to and satisfaction with, their health care.² Unfortunately, the reality in the United States is that across the board, the workforce responsible

for advancing the nation's research and health care does not come close to representing the nation's diversity. Data from the National Cancer Institute show a dearth of cancer researchers from diverse backgrounds.³ For example, although Hispanics and African Americans are a combined 30% of the U.S. population, only 8.6% of medical scientists are Hispanic or African American.⁴ In 2013, minorities held only 4% of

research grants funded by the National Institutes of Health.⁵ Compared with Whites, fewer minority clinicians enter the health care workforce and even fewer hold leadership positions.⁶

Health care is the fastest growing occupational sector in the United States, with a projected 4 million new jobs by 2026, and accounting for one-third of all new jobs.⁷ The nation's demography and state of the nation's health care system call for increased efforts to diversify this health care workforce, starting at the initial points of entry to research and health delivery system careers at the high school and undergraduate levels. These early entry points include attending college, pursuing science tracks/majors, and partaking in volunteer or paid research or health delivery experiences. However, students from low-income minority and other underrepresented groups experience multifaceted barriers that place them at a disadvantage across these entry points. For example, URM students account for only 20% of biomedical and behavioral science majors; only 24% complete a science degree in 6 years compared with 40% of White students.^{8,9} For URM students who enter science tracks in college, many factors result in students leaving, including few science faculty of color, limited high school preparation for college science courses, financial pressures, and experiences of discrimination.¹⁰⁻¹²

LEVELING THE PLAYING FIELD

There are huge financial barriers for the one-third of American families with children who have zero or negative wealth.¹³ Compounding these financial barriers, the pathways for entering cancer research and health care professions, and for finding health care career-enhancing experiences, are rarely made explicit to students from low-income communities.¹⁴⁻¹⁶ These students rarely have access to internships or knowledge of available options to make career-enhancing experiences possible (e.g., getting course credit, being paid to do research). They are rarely coached about the social interactions for entry into a professional field (e.g., what to include in an "elevator pitch" or an email to faculty). They are less likely to be able to use the connections and first-hand knowledge of their families and social networks to "get ahead."¹⁴⁻¹⁶

PROPOSED SOLUTIONS

Initiatives in the United States to address health care workforce pipeline disparities have largely involved technical and

vocational education in K-12, public awareness campaigns, and select academic enrichment and learning experience opportunities.^{17,18} However, these programs tend to be resource intensive and difficult to scale—thus, limiting impact when programs reach a few dozen rather than many thousands.¹⁹ Solutions for scaling health care workforce development are needed. One solution may come in the form of emerging digital technologies that offer tools for enhancing reach and impact of health care workforce development initiatives.

ORIGINS OF THE CAREER 911 MOOC

Emerging technologies are transforming digital learning and online education. These technologies can potentially be used to address educational disparities. There is increased use of online education, reflecting a narrowing of the digital divide, and increased broadband access. Educational websites that have gained traction include Khan Academy and Codecademy that offer online resources to supplement in-class learning. Moreover, learning management systems such as Canvas and Blackboard enable distance learning courses for institutions of higher education. There are also digital educational platforms such as Coursera, edX, and Udacity that host MOOCs. MOOCs in particular, have been embraced as a promising solution for democratizing higher education, as MOOCs can be made available for free, accessible to anyone with an internet connection.²⁰

In 2013, Northwestern University partnered with the Coursera platform to deliver MOOCs. Tying together emerging technologies and workforce development to advance health equity, a team led by Dr. Melissa Simon at Northwestern University took that opportunity to develop "Career 911: Your Future Job in Medicine and Healthcare." The Career 911 MOOC was launched in 2015 to help students explore health-related career options and learn how to build career portfolios to enter health-related professions. In this report, we describe the evolution of the Career 911 MOOC as a resource and lessons learned.

CAREER 911: DEVELOPMENT

The team assembled envisioned a resource for advancing health equity by way of health care workforce development, an online resource that could be used by both individuals and training programs to level the playing field and enhance the

pipeline of individuals from diverse backgrounds entering health care and research professions. Specifically, we sought to create a Career 911 MOOC to address barriers to entering health care careers experienced by students from minority and low-income backgrounds, starting at the high school and undergraduate levels. This concept was presented to the dean’s office in January 2014 in response to a call for proposals to develop Northwestern-backed MOOCs.

Upon receiving approval and funding, we assembled an interdisciplinary team of faculty, health care professionals, instructional designers, video/digital media specialists, and first-generation college students. From early in the process, we held meetings with community stakeholders, including educators and community advocates. These meetings identified a need for educational content exposing students to a variety of health care careers to broaden their career possibilities. Meetings also identified synergistic programs that could benefit from a resource such as Career 911, and generated referrals to community leaders and health professionals willing to take part in videos for the course content.

Filming of course content began in November 2014 and the ensuing 5-month production period consisted of filming more than 50 different lecturers and health professionals representing diversity with respect to race/ethnicity, age, career level, and profession. When possible, health professionals were filmed on location to help students visualize career possibilities. Professions depicted in course videos included those in direct patient care, community and social services,

science and technology, policy, and leadership. Table 1 lists a sample of the occupations and health fields presented in the Career 911 MOOC.

Course content focused on introducing individuals to health-related careers and to build skills and a career portfolio for their health career journey. Skills-building topics included strengths and values assessment, personal narrative, resume and cover letter writing, job search, interviewing, professional networking, and professional communications. We packaged content into modules for students to learn at their own pace and for educators (e.g., teachers, guidance counselors, and workforce development program coordinators) to use as resources to support students’ career readiness and to supplement their classroom curriculum. Each module contained a set of 5- to 6-minute videos augmented by discussion forums, resource links, and assignments. Short lecture format videos were presented alongside “Day in the Life” videos that showcased what dozens of health care professionals do. “Keeping It Real” videos highlighted personal stories and career journeys of diverse health professionals and students—such as a former Chicago gang member’s pathway to a master’s degree in social work and job delivering front-line care at a rehabilitation hospital. His pathway had started as a victim of gun violence that resulted in a long-term spinal cord injury. At the culmination of the course and completion of assignments, students will have a completed career portfolio consisting of a resume, cover letter, mapping of steps toward their career goals, elevator

Table 1. Health Occupations and Fields Presented in Career 911

Bioinformatics specialist	Interpreter/translator	Physician
Biological anthropologist	Licensed Practical Nurse	Physician assistant
Biotech and pharmaceuticals	Medical professor	Psychiatrist
Commissioner of public health	Midwife	Psychologist
Community health worker	Military physician	Reproductive scientist
Deaf services coordinator	Nurse	Research assistant
Dentist	Obstetrician/gynecologist	Scientist
Domestic violence coordinator	Patient navigator	Social worker
Epidemiologist	Patient services coordinator	Transplant surgeon
Geriatrics	Pharmacist	Unit secretary
Health care executive	Phlebotomist	Veterinarian
Health policy advocate	Physiatrist	

pitch, and a professional networking plan with informational interview questions prepared.

Throughout course production, we used strategies to optimize student engagement and usability within classrooms and existing programs. For example, we produced 41 short videos (totaling 235 minutes) rather than lengthy lecture videos so that teachers could more easily incorporate content into classroom periods with already packed curriculum. We also “gamified” the skills-building assignments for students; as an example, we designed an online health career scavenger hunt. From evidence-based practices in multicultural education, we used difference education and intergroup dialogue in Career 911 videos, assignments, and discussion topics to facilitate understanding among students on how their different backgrounds matter, and how social differences can shape their experiences and opportunities in their academic and professional careers.²¹

CAREER 911: EARLY RESULTS

We hosted the 6-week inaugural run of Career 911 in the Spring of 2015. Student data provided by Coursera were de-identified and aggregated, consisting of demographic variables (collected upon learners’ registration for a Coursera account and country of residence based on IP resolution) and activity metadata from course interactions (e.g., enrollment, video viewership, assignment submissions, discussion forum contributions). To supplement the demographic data collected during Coursera’s student enrollment process, we also administered a brief online survey during the first week to explore student motivations for taking the course and the type of learner they are (e.g., student, teacher).

A total of 8,338 learners enrolled in the first 6-week run of Career 911, for which Coursera provided aggregate self-reported demographic data for the 4,553 enrolled learners who had provided demographic profile information during enrollment. These data revealed that 55.6% of learners were female, 47.5% reported a race/ethnicity other than White, 42.7% were students, and 63.3% were not employed full time. The mean age of learners was 34.2 years. Among the 530 respondents to our online survey, 14% indicated that they were an educator and 11% indicated that they were interested in using components of the course for their students.

However, the aggregate data provided by Coursera of the first 6-week iteration indicated that overall Career 911

course engagement was low. Of the 8,338 enrolled learners, 2,894 learners (34.7%) watched a lecture, but only 730 (8.8%) submitted an exercise, and 877 (10.5%) browsed the discussion boards. Nonetheless, of the 730 students who completed at least one of the exercises during the first 6-week run, a sizeable 450 students explored career websites such as the U.S. Department of Labor’s *My Next Move*²² during Career 911’s health careers “scavenger hunt.” Moreover, 220 students mapped their 1-, 2-, and 5-year career steps to achieve their target profession/job, 163 students assembled a professional networking plan with informational interview questions, and 160 students developed an elevator pitch. For the modules presented at the latter half of the course—132 students created a cover letter, 125 students created a resume, 121 students prepared responses to interview questions, and 103 students participated in the goal setting exercise.

We ran two more 6-week sessions in 2015 before Coursera overhauled their session-based platform into an “on-demand” model, removing fixed start/end dates and assignment due dates. The Career 911 course content was migrated over into Coursera’s on-demand platform in April 2016. Although course content remained the same, this transition enhanced the versatility of the course, because learners no longer had to contend with enrollment deadlines. Moreover, the on-demand platform required less instructor/personnel support, and thus was a step toward sustainable long-term implementation. In August 2016, Coursera underwent another platform update and Career 911 transitioned to (and has since remained in) a flexible session-based format that consists of regular sessions with fixed start/end dates but no assignment due dates.²³ Coursera enrollment data of April 2015 to April 2018 indicate that more than 20,000 students from 160 countries have signed up to take Career 911.

ENGAGING CHICAGO COMMUNITIES WITH CAREER 911

Locally, Career 911 has gained traction on the ground in Chicago, which is home to Northwestern’s medical school and its academic hospital system, Northwestern Medicine. According to 2016 census data, 29% of Chicago residents are African American or Black, 30% are Hispanic/Latino, 19.1% live below the federal poverty line, and only 38.5% have a bachelor’s degree or higher.²⁴ Early meetings at the project development phase in 2014 established key partnerships with

local educators, community stakeholders, school systems, and governmental agencies—such as Chicago Public Schools (CPS), the Illinois Department of Commerce and Economic Opportunity, the Illinois Health Science Learning Exchange, and GEAR UP Chicago. These partnerships were vital for integrating the Career 911 curriculum into existing programs for career readiness, employment, and health care careers.

Career 911 and the CPS

With support from a champion within the CPS Office of College and Career Success, whom we worked with during the Career 911 development phase, we were able to include the Career 911 MOOC in the CPS Health Sciences Career & Technical Education (CTE) curriculum in the fall of 2015 for sophomores and juniors at 13 CPS high schools. The CTE health sciences program focuses on exposing high school students to health careers, while increasing career readiness and professionalism skills.^{25,26} We discovered during our ongoing technical assistance that teachers viewed Career 911 as a valuable supplement for students in their classrooms, despite encountering technical issues (e.g., student logins, submission of student assignments) associated with the Coursera platform. Direct feedback from teachers to our Career 911 technical assistance team relayed that career-related messaging from health care professionals associated with reputable institutions lent credibility to CPS CTE's health care career pathways.

Enhancing Capacity of Pipeline Programs: Chicago Cancer Health Equity Collaborative

Many of the relationships developed during the Career 911 development phase would pave the way for further collaboration in related initiatives, such as with the Chicago Cancer Health Equity Collaborative (ChicagoCHEC) launched in 2015 as a National Cancer Institute comprehensive cancer partnership led by the Robert H. Lurie Comprehensive Cancer Center of Northwestern University, Northeastern Illinois University, and the University of Illinois at Chicago. As an example, Career 911's CPS liaison later served on the selection committee of the ChicagoCHEC Research Fellows Program, Chicago's first city-wide undergraduate cancer health equity training program that brings together 20 community college, public institution, and private institution undergraduate

students each summer to learn together in an 8-week research internship experience. As another example, Career 911's Chicago GEAR UP liaison would go on to work closely with ChicagoCHEC investigators to establish near-peer mentoring opportunities between GEAR UP high school students and ChicagoCHEC Research Fellows Program undergraduate students. Moreover, several of the instructors and health care professionals filmed for Career 911 went on to accept leadership, mentorship, and other roles within ChicagoCHEC's research education initiatives.

It is in part this confluence of cultivating partnerships, bridging related initiatives, and leveraging ongoing work that has enabled the Career 911 MOOC to serve as a learning resource for local health care, research, and science, technology, engineering, and math (STEM) pipeline programs. In particular, it has served as a foundational resource for preparing students participating in the ChicagoCHEC Research Fellows Program, brought about when ChicagoCHEC educators were developing the curriculum and realized the need for resources that would help optimize in-person summertime programming. Thus, ChicagoCHEC Research Fellows have been asked to complete portions of the Career 911 MOOC before the first day of the program. This sets the stage for subsequent hands-on workshops reinforcing professional skills first introduced in the Career 911 MOOC that will help prepare students to seek out, apply for, and gain opportunities to advance their engagement with real-world cancer research and cancer care career trajectories.

Discovering Health Care Careers Program and GEAR UP

Each summer, the Career 911 MOOC also serves as a supplemental resource for the Lurie Children's Hospital of Chicago's "Discovering Healthcare Careers Program" and the Chicago GEAR UP Program (Gaining Early Awareness and Readiness for Undergraduate Programs) at Northeastern Illinois University. The "Discovering Healthcare Careers Program" involves more than 50 Latino students ages 17 to 19 from underserved Chicago public high schools spending the summer shadowing hospital staff, hearing presentations from the hospital's pediatric care specialists, and are stimulated to think of a health professions career. GEAR UP offers events and programming seeking to increase students' rate of graduation and participation in postsecondary education.

Discovering Healthcare Careers and GEAR UP students complete Career 911 modules in resume and cover letter writing, job search, interviewing, professional networking, and professional communications in research and health care-related professions.

LESSONS LEARNED

Strategic Partnerships, Advocacy, Policy, and Community Health Research Networks, and Ties to Community Resources

Career 911 would not have gotten off the ground without technical assistance and seed funding from Northwestern for course production. Universities engage in partnerships with MOOC platforms in part to generate revenue and enhance the reputation of their degree-granting programs,²⁷ but Career 911 was not positioned to contribute to either. However, our value to institutional leaders was our ability to bridge a premier academic institution with its local community. We found maintaining this “big picture” to be particularly important, especially when Career 911 amounted to greater production challenges (e.g., filming >50 lecturers) and generated less revenue (e.g., this course is available for free) than other MOOCs. Thus, being able to articulate the benefits of a community-oriented, workforce development initiative within the context of institutional value was key to securing crucial resources.

Countering Technology’s Potential to Exacerbate Educational Disparities

Although a key principle of MOOCs is to democratize education, online learning approaches also have the potential to exacerbate educational disparities. For example, students from more affluent neighborhoods may have greater access to technologies and thus may be more likely to enroll in, complete, and benefit from MOOCs.²⁸ Key to maximizing engagement of our target low-income audiences was involvement of community stakeholders and educators in the design of Career 911. Instructors were also diverse and highlighted their own nontraditional career trajectories in course videos. Moreover, our promotional and implementation strategy focused on engagement in local underserved neighborhoods, schools, and health care/STEM pipeline programs. The Career 911 MOOC’s reach among low-income and URM students is reflected in

the diverse sociodemographic makeup of students enrolled in CPS (39% African American/Black, 46% Hispanic/Latino, 80% low income),²⁹ students in the Discovering Healthcare Careers Program in partnership with Chicago GEAR UP (100% Hispanic/Latino), and students in the ChicagoCHEC Research Fellows Program (32% African American/Black, 31% Hispanic/Latino, 64% first-generation college student).

Minimizing Disruptions from Changes to Technology

A challenging aspect of working within digital learning platforms is the speed at which technology evolves. Career 911 experienced multiple Coursera platform overhauls. Although we received Coursera-backed support for the transfer of content between platforms, there was inevitably content we created that could not be recycled. For example, written and video “how-to” guides we created for CPS teachers and printable/downloadable assignments became outdated every time there was a change to the Coursera user interface, because directions in our written and video guides no longer matched how the content looked on the Coursera website. We often found ourselves being reactive, rather than proactive, with course modifications. Thus, a lesson learned when working within educational technologies is to plan for inevitable changes in technology. Becoming familiar with technology workflows and building strong working relationships with technology partners can facilitate planning that will leverage technological updates and minimize disruptions.

Optimizing Data for Program Evaluation

A key limitation in Career 911 program evaluation efforts is that user data from Coursera came in aggregate form. This precluded our ability to analyze specific populations of interest. Furthermore, with teachers logging into the course and using it in classrooms, we were unable to systematically gain insight into students’ experiences of usability and satisfaction with the material presented. Implementation science methods, focusing on the context in which programs are adopted and implemented,³⁰ may hold promise in generating insights about program use. Thus, we plan to conduct additional research involving an assessment of the characteristics of the organizational settings and qualitative interviews among educators using the Career 911 MOOC in their classrooms and health care/STEM pipeline programs.

ACKNOWLEDGMENTS

The authors acknowledge the Simon Lab, the Northwestern University Advanced Media Production Studio, the Cancer Health Disparities Research Program participants, the Posner Summer Fellowship Program, Career 911 instructors & participants, CPS Career and Technical Education Health Sciences Cluster, and the many community and educational leaders who have provided invaluable input into the development of Career 911. Dr. Simon and Laura Tom had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. All authors declare no conflicts of interest, including relevant financial interests, activities, relationships, and affiliations. Melissa Simon is a member of the United States Preventive Services Task Force (USPSTF). This article does not necessarily represent the views and policies of the USPSTF.

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