A Transformation in Health Sciences
Education: A Description of Health
Sciences Online

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Abstract. In this article, we describe what we expect will be a substantive
transformation in health sciences education: Health Sciences Online
(www.hso.info). HSO is the first website that delivers authoritative,
comprehensive, free, and ad-free health sciences knowledge. It is a portal to the
best health sciences knowledge, and the foundation of what we expect to be the
most accessible, high-quality health sciences university. This article describes the
site and the resources currently available through HSO, and our plans for further
development of this resource.

Keywords. public health, education, health sciences, university, medicine

1. Introduction

Health Sciences Online (HSO) is designed to be a learning resource for health scientists
in training and practice around the world. Anyone can search for any health sciences
topic from over 50,000 courses, references, guidelines and other learning objects in
medicine (both basic and clinical sciences), public health, pharmacy, dentistry, nursing,
and other health sciences disciplines. Materials are selected from accredited
educational sources including universities, governments, and professional societies by
knowledgeable staff at HSO. By opening our home page and typing in a search term in
any of 42 languages, individuals may access a huge variety of learning objects.

Our founding collaborators and funders include the American College of
Preventive Medicine, Annenberg Physician Training Program, Centers for Disease
Control and Prevention, NATO’s Science for Peace Project, University of British

2. Development of Content

Our content team defined, identified, and obtained appropriate materials by researching
the websites of and contacting potential collaborating universities, accredited specialty
societies, and government organizations. Guidelines [1] are based on a number of

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internationally developed models for excellence in web-based health sciences education [1–7]. Content criteria included sufficient depth, applicability, credibility, and design. For example, information needs to be considered relevant to a health sciences topic, to be useful by itself as a teaching and learning tool (for example, no power point slideshows without lecture notes or an accompanying audio track). The website needs to be educational without advertising or marketing, the source to be credible, the material current, the links functioning, and the site needs to be free and user friendly.

Our advisory committee [8] is comprised of a large and distinguished group including health leaders, educators, content partners, and experts in communication and information technologies from around the world. Our advisory committee provides input into project design and implementation.

3. Creating a Virtual Health Sciences University

We pilot tested our website from 2006 until our December 2008 launch, testing in eleven countries in Africa, Asia, and North America, using small convenience samples of health professionals in training and practice. Our purpose was to obtain feedback on the Health Sciences Online portal organization, search function and results layout, other website features, and user expectations. Nearly all users indicated at that time that the HSO website will make their work more effective and productive, help them learn, and increase their motivation for and interest in learning.

Since our launch in December of 2008 we have also received very positive reviews on the site. Jeff Koplan, MD, MPH (former CDC Director) calls HSO “a visionary undertaking”, and third party online reviews have called it “in the top 4 health search engines … the internet at its finest … a boon … an incredibly worthwhile enterprise … a model of what Health 2.0 and Science 2.0 can be … one of the most altruistic and honorable health service resources on the planet.”

In 2008 we delineated eight revolutions that could be accomplished with the help of Health Sciences Online. This included transformations in health sciences education, disease surveillance, needs assessment, telemedicine, funding, public health ethics, CME integrity, and local opportunities. These opportunities are outlined more fully in “Health Sciences Online: 8+ revolutions and 10+ brief analyses” [9].

Our mission for the first phase of Health Sciences Online was to “create a world where health professionals in training and practice access comprehensive, easily found, high quality, free, current resources, references and other learning resources to improve health”. Having made this vision available to those with online access, our second phase of HSO’s vision is to “create a world where anyone can become and remain a well-trained health professional in a discipline where they are qualified and there is a need”. To accomplish this, we plan to create a virtual health sciences university.

3.1. Aim and Background

The general aim is to develop a computer- and community-based training model to rapidly expand the number of health practitioners (HPs). According to WHO, the world needs over 4 million additional HPs, and needs innovation to educate them more efficiently. There is a huge, nearly universal need for many more well-trained clinicians, and in the U.S. alone, the Association of the Schools of Public Health estimates that by
2020 an additional 250,000 public health workers on a variety of levels are needed. A 2006 WHO report states that at least 57 countries, most of them in sub-Saharan Africa but including Bangladesh, India and Indonesia, face “crippling” public health workforce shortages. But this need is not being filled by our current system of building one autonomous clinical or public health training program at a time, and requiring adult learners to routinely leave their home environments for education and training. We believe our model could be a major step in transforming health sciences training, and have a huge impact on global health.

3.2. The Educational Model

Online health-sciences education has until recently been a mixed offering. Although there are many outstanding computer-based resources, good materials are difficult to find in the flood of mediocre and questionably sourced resources. In addition, exclusively online education forgoes the depth of knowledge provided by hands-on participation. One response to this problem is HSO, coupled with hands-on learning.

We will provide certificates and degrees across the health sciences, combining didactic teaching with the best available online materials, peer-to-peer learning, and local mentorship. Since broad-scale implementation of this would be a huge shift, we will initially pursue this in our most familiar areas (public health and select specialties in medicine), and could also initially pursue this as an experiment, including partnering with programs that offer more conventional training to compare the experience, quality, efficiency, and outcomes of this new model with more conventional approaches.

In this new method, we will work with panels of expert practitioners and educators to create curricula. For example, in public health we would build curricular guidelines developed by organizations such as the North American Council on Education for Public Health and the Association of Schools of Public Health in the European Region. We will then populate the curriculum with resources from HSO, with gaps filled by new content development from partner institutions. Would-be HPs would apply to and undergo selection by the program (using pre-determined selection criteria), receive training in e-learning, and partner with a local practitioner, ideally in geographically clustered groups. Each group will follow a curriculum of computer-based assignments on a specified schedule. Trainees will occasionally meet in person with their local peers and mentor to discuss cases and have their skills/practices observed, and will have frequent live and asynchronous chats with their remote peers and mentors. Trainees will be encouraged to post information about their use of materials and other educational experiences, and to assess and give both named and anonymous online feedback to HSO and the collaborating institutions during their training whenever desired, and at regularly scheduled feedback opportunities. Trainees will need to pass objective, knowledge-based tests, and perform both self- and peer-assessments, and mentors will also assess their competence.

Trainees will be selected based on criteria developed by our advisory committee, such as passage of an English language proficiency test (at least until our 42-language translator tool becomes significantly better), a good GPA on transcripts, and good letters of academic, community-based, and/or clinical recommendation.

These provisionally accepted trainees will immediately receive materials that provide an introduction to e-learning, and to their subject, and a choice of doing at least two practical skill sets. Trainees will be assigned to mentors who they have identified, or to ones we help them find through organizations such as our partners Scientists
Without Borders, and Community Labs (both of which globally identify mentors for such purposes). Mentors will be remotely trained to supervise and teach trainees, including clear instructions about only allowing one day per week for very basic practicum work (depending on the training emphasis, activities like determining patients’ vital signs, collecting survey data, collecting and analyzing smears for basic pathogens, or translating health education brochures to be linguistically and culturally relevant), with the level and types of responsibility growing in challenge as the trainee acquires more skill. Trainees will choose their pre-enrollment skill set modules together with their mentors, to determine which skill sets that are of interest to them would be most useful where they will reside during their training. These pre-enrollment skill sets would include a broad range of practical skills about which they could learn, again depending on the emphasis, it could be about fundamentals of nutrition, maintenance of vaccine cold chains, the public health laboratory, using epidemic surveillance techniques, or creating culturally-appropriate health education materials.

The concept is that the trainee should be useful enough to their mentor, in a skill set that is of interest to the trainee and needed by the mentor, that it makes the mentor feel somewhat compensated for their efforts, and avoids having the trainee feel like they are in an onerous apprenticeship. Trainees’ passage of the introductory and chosen skill set tests will be a requirement for full enrollment in their academic program, along with a letter of commitment from a mentor with whom they have already collaborated, either continuing to use their current mentor, or finding another one if the original choice did not work.

Trainees’ time will be spent on hands-on work, individual study, case-based learning from their own cases with small local groups of trainees and some mentors, asynchronous web-based discussions, and collective training, averaging out (for those in full-time study) as follows:

- **Practical work:** several hours/day on hands-on health work of various types, working with their mentors, with the expectation that they will spend some time most days observing or performing a new skill, and with a log kept of those activities.
- **Didactic study:** several hours/day on assigned individual study and on case-based learning, using HSO-identified lectures, textbooks, guidelines, and other resources (and occasionally identifying additional resources to add to the HSO bank). Trainees will receive didactic study materials that are of the highest quality.
- **Small groups:** 1–2 times/week meeting in small groups with other trainees assigned to the same mentors, for teaching, sharing, and processing experiences. This will include having trainees immediately begin a case-based learning system that is based on their own cases. We believe that this immediate initiation of using one’s own experiences for cases is a novel and potentially very beneficial way to train health practitioners that the foundation of life-long learning is learning from your cases.
- **Online communities:** 1–2 times/week participate in asynchronous chats with trainees, mentors, and faculty at other sites, with opportunities to post information about their use of materials, and other educational experiences.
- **Collective in-person training:** depending on resources and circumstance, occasional meetings in larger groups for in-person training, testing, and acculturation.
Trainees in both the certificate and MPH programs will be encouraged to assess and give both named and anonymous online feedback on this model, and at regularly scheduled feedback opportunities. Individual trainees, mentors, didactic materials, and the overall program will be evaluated, with criteria developed by our advisory committees. Trainees will receive testing that is at-least as rigorous as typical PH certification or master’s evaluation, with guidance from published international criteria and consultation from existing training and Master’s programs. Trainees’ will be tested on their knowledge with instruments similar to more-traditionally trained practitioners, and there will be testing to evaluate whether their knowledge and skills are comparable. We expect that our graduates will pass all internally-developed exams, as well as selected external exams. For example, we have been given permission to use the Test for Interpreting and Reporting Statistics, based on the book, How To Report Statistics in Medicine: Annotated Guidelines for Authors, Editors, and Reviewers, 2nd Edition, by Thomas A. Lang and Michelle Secic (Philadelphia: American College of Physicians, 2006). Likewise, we would be interested in having MPH-level graduates pass the Council on Education and PH Board examination, and are in very early discussions to obtain a discounted large-scale arrangement from them. Mentors will also assess their trainees’ competence, and there will be training-appropriate peer-to-peer feedback. Where we choose to have an experimental design, trainees’ will be tested on their knowledge with similar instruments as more-traditionally trained practitioners, to evaluate whether their knowledge and skills are comparable. Our hypothesis is that they will perform at least as well in written and oral testing and in clinical performance as traditionally-trained HPs.

3.3. Conclusions

In 1798 Immanuel Kant wrote that the original describers of a university were right to “handle the entire content of learning … like a factory, so to speak – by a division of labor … to form a kind of learned community called a university” [10]. We need a larger learned collective, and should try new ways of achieving this centuries-old dream with the powerful tools we now have available.

References