Review Article

National Society for Histotechnology and Digital Pathology Association Online Self-Paced Digital Pathology Certificate of Completion Program

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Abstract

The field of digital pathology has rapidly expanded within the last few years with increasing adoption and growth in popularity. As digital pathology matures, it is apparent that we need well-trained individuals to manage our whole-slide imaging systems. This editorial introduces the joint National Society for Histotechnology and Digital Pathology Association online self-paced digital pathology certificate program which was launched in May 2018 that was established to meet this demand. An overview of how this program was developed, the content of the educational modules, and the way that this program is being offered is discussed.

Keywords: Certificate of completion, certification, digital pathology, histology, histotechnology, image analysis, on-line learning, whole-slide imaging

Introduction

In 2016, the National Society of Histotechnology (NSH) noticed the lack of formal educational opportunities and standards for clinical practice within the digital pathology environment. As a part of NSH's strategic plan to address this limitation, the society formed a digital pathology certificate workgroup (DPCW) to develop a new online self-paced certificate program that would increase knowledge and improve competency in digital pathology and whole-slide imaging. Members of the DPCW were charged with developing a series of learning modules and best practices that would be delivered to participants in a web-based format. After successful completion of this program, participants would be awarded a certificate to recognize their achievement. A survey in 2017 by the Digital Pathology Association (DPA) to its members revealed that the vast majority of their members were interested in acquiring some sort of digital pathology education certification. The program was launched in May of 2018.

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Discussion

This workgroup was formed by the education and quality management committees of the NSH chaired by Elizabeth Chlipala. Kathy Dwyer, chair of the quality management committee and Traci DeGeer, chair of the education committee were included as members. The goal was to have representation on the DPCW from all three of the environments in which the technology is currently being utilized, namely, clinical, research, and education. Moreover, the intent was to also include individuals that have extensive and wide experience within the discipline and that had been utilizing digital pathology for some time. Early on, the NSH board of directors realized that the DPA should be involved in the development

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of this program. The 10-person workgroup included as follows: Elizabeth Chlipala, Traci DeGeer, Kathleen Dwyer, Shelley Ganske, David Krull, Haydee Lara, Lisa Manning, Liron Pantanowitz, Dylan Steiner, and Lisa Stephens, with facilitation from the NSH President Diane Sterchi, as well as NSH staff members Aubrey Wanner, and Connie Wildeman.

While the initial intent of the program was to serve a need within the histotechnology community, the scope was subsequently broadened to create a program that would benefit anyone who was interested in learning about or expanding their knowledge of digital pathology, including whole-slide imaging. Hence, the program targeted not only histologists but also pathologists, IT specialists, educators, software engineers, and vendors.

The online certificate is a self-paced learning program that consists of seven modules [Table 1]. Each module consists of multiple sessions ranging from 20 to 60 min for a total of 35 sessions with 22 hours of content. Within each module, there are multiple sessions of recorded webinars and accompanying PowerPoint presentations. In addition, each module contains a resource library containing module glossaries, sample standard operating procedures, tracking forms, relevant published articles, applicable white papers, and a PDF handout for each session. This supplementary material was added to help individuals who were asking where they could get started, and what they really needed to know to successfully implement this technology. At the conclusion of each session, participants are requested to complete a knowledge check. Knowledge checks consist of several questions asked in a variety of formats about the session that was just completed. The course is completed with a final exam consisting of 20 questions. The registrant must receive a 70% or better score to receive their certificate of completion for the course. The digital pathology certificate of completion program can be found at https://learn.nsh.org/at a cost of $499.00 for NSH and DPA members and $599.00 for all others.

Table 1: Digital pathology certificate of completion program modules

Module	Sessions
Module 1. An introduction and history of digital pathology Participants will be provided an explanation of the goals, processes, and overview of the modules. Define major environments of digital pathology. Review evolution and history of digital pathology	1.1 Module overview 1.2 History of digital pathology
Module 2. Basic of the technology Define whole-slide imaging systems, components, framework, hardware, and software. Review scanners, viewers, and computer monitors. Discuss IT infrastructure, storage, databases, and interoperability. Discuss the process of image capture, viewing, storage, and management	2.1 Module overview 2.2 Whole-slide imaging systems 2.3 Scanners 2.4 Image viewers and computer monitors 2.5 IT infrastructure
Module 3. Use cases for digital pathology Identify and discuss clinical, educational, research, and histology uses for digital pathology. Understand future/potential clinical uses and how it will affect the pathology laboratory. Explain how use cases could be applied for your current laboratory practice	3.1 Module overview 3.2 Current clinical uses of digital pathology 3.3 Research uses of digital pathology 3.4 Education uses of digital pathology 3.5 Histology use cases of digital pathology 3.6 Future and emerging clinical uses of digital pathology
Module 4. Selecting and implementation a digital pathology solution Learn how to establish requirements for selecting a digital pathology solution. How to assess digital pathology systems - hardware and software (network capabilities). Review IT connectivity and image storage considerations. A brief explanation of image and pathologist validation. Sample preparation - histology	4.1 Module overview 4.2 Establish your requirements 4.3 Assessing and selecting digital pathology system 4.4 Installing and supporting a WSI system 4.5 Implementation and training
Module 5. Workflow considerations and best practices Define a workflow that will best fit into your laboratory environment. Define best practices. An introduction to understanding what is required for quality and compliance (verification, validation, and regulations) Training and competency for digital pathology. Managing change control for the digital environment	5.1 Module overview 5.2 Defining a workflow - clinical focus 5.3 Defining a workflow - research focus 5.4 Defining a workflow - education focus 5.5 Definition of best practices 5.6 Introduction to quality and compliance
Module 6. Image analysis Understand the importance of image analysis in digital pathology. Learn how to implement image analysis solutions. Introduce some commercially available platforms for image analysis	6.1 Module overview 6.2 Background and basic concepts in image analysis 6.3 Image analysis applications in digital pathology 6.4 Implementing image analysis in your laboratory
Module 7. Regulatory requirements and validations Regulatory overview, including CAP regulatory requirements for digital pathology. Verification and validation for clinical specimens. Validation for research specimens. Validation in education and training	7.1 Module overview 7.2 Regulatory overview 7.3 Verification and validations of clinical specimens 7.4 Validation for research 7.5 Validation for education and training 7.6 Validation of image analysis in a clinical setting

CAP: College of American Pathologists, IT: Information Technology

Contributing faculty for the content was selected using a three-pronged strategy. First, people volunteered once they heard about the program. Second, committee members used their connections and networks to recruit authors. Finally, the committee reached out to subject matter experts within the field to solicit custom content. The faculty consisted primarily of pathologists, but other contributors came from individuals working in the fields of informatics, business development, education, and histotechnology [Table 2].

Because of the launch of the certificate program, 217 individuals have enrolled. The program continues to receive requests for group orders by laboratories. Till date, 72 participants have completed the course, 18 have requested their formal certificate and have answered the postquestionnaire. Of the individuals who have answered the postquestionnaire, 39% took this course because their organization has adopted digital pathology, 28% because their organization will be implementing digital pathology, and 22% because they are leading the discussion on implementation and wanted to learn more. Eighty-three percent of the respondents felt that nearly all modules were informative and provided new information, whereas 17% of the respondents felt that half of the modules contained new information. Written feedback primarily included requests for more advanced topics while there were two individuals who thought the audio quality could be improved in some of the sessions.

This course is helpful not only to individuals who are new to digital pathology but also to folks who have been working with this technology for a while. This program will not only increase the knowledge and improve the competency of those individuals who are awarded a certificate but will also grant recognition to those individuals who are so important to safely using digital pathology in routine clinical practice. Completing this certificate will hopefully also lead to career advancement for histologists, provide diversification in their skill set, empower them to become champions of digital pathology in their own laboratories, and improve job satisfaction.

Given that the technology, applications, and regulations related to digital pathology are in flux, it will be important to keep the content of the program up-to-date and relevant. Hence, the DPCW will continue to meet to evaluate and update content, create new more advanced content/modules along with reviewing feedback from individuals who have taken the course and adjust as necessary. New modules with updates will be released in 2019.

Table 2: Digital pathology certificate of completion program faculty members

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Conflicts of interest
There are no conflicts of interest.