A100 Tacit Knowledge, Deliberate Practice, and the Development of Expertise in the Forensic Sciences

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After attending this presentation, attendees will understand the concepts of tacit knowledge and deliberate practice and the role these concepts play in the development of expertise in forensic science.

This presentation will impact the forensic science community by emphasizing the need for forensic examiners to develop personal programs of deliberate practice (research, continuing education, and critical case review) in order to attain the highest level of professional expertise.

This paper reviews recent research on the development of expertise (defined as a high level of performance in a given field) and examines the ramifications of this research for graduate education in the forensic sciences. It will also examine the nature of the scientific knowledge, which students must absorb and then look at the means by which this knowledge is presented to students. The 2009 National Academy of Sciences Report, "*Strengthening Forensic Science in the United States: A Path Forward"* stated: Forensic science examiners need additional training in the principles, practices, and contexts of scientific methodology, as well as in the distinctive features of their specialty. Training should move well beyond intern-like transmittal of practices to teaching that is based on scientifically valid principles.

While no one would contest the value of more education in scientific methodology, the denigration of intern-like training is problematic. According to philosopher Michael Polyani, sociologist Harry Collins, and others, all scientific fields have a component of tacit knowledge—knowledge obtained by deep immersion in groups that possess it. Tacit knowledge comprises knowledge that cannot be gained by reading scientific texts or even by reviewing the peer-reviewed research literature in a discipline. Moreover, tacit knowledge is required for the development of expertise in a scientific discipline. Intern-like transmittal of practices within a scientific discipline is a legitimate mechanism for the conveyance of tacit knowledge (as is on-the-job training in a forensic science laboratory). Doctoral programs in the experimental sciences have long consisted of intensive, intern-like exposure to the practices of the particular field of study. Such exposure is an essential antecedent to conducting doctoral level research.

Extensive research by K. Anders Ericsson and his colleagues has shown that high levels of performance in fields such as athletics, music, and science are the result of long periods of what Ericsson has termed deliberate practice. Deliberate practice means not merely repeating the same tennis swings or pieces of music over and over again. Rather it means pushing the envelope, tackling more and more difficult activities. Deliberate practice also involves a considerable degree of critical self-reflection. According to Ericsson, approximately ten years or 10,000 hours of deliberate practice are necessary for the attainment of true expertise in a field.

The typical graduate student in the forensic sciences begins his or her graduate degree program after completion of four years of study. Only a small part of undergraduate study would qualify as deliberate practice. Even after the student obtains his or her graduate degree in forensic science and moves into a forensic laboratory (perhaps completing a short on-the-job training program), the student is well short of the ten years or 10,000 hours of deliberate practice required to attain true expertise. While reading the scientific literature and attending workshops allow the bench forensic scientist to remain current in his or her field, such activities do not constitute deliberate practice. Moreover, case work in general does not constitute what Ericsson means by deliberate practice. Case work in many forensic science fields is routine and does not challenge the forensic examiner to extend his or her skill set.

Graduate degree programs in forensic science should have three goals: reinforcing students' grasp of scientific methodology, conveying tacit knowledge in the students' fields of concentration, and developing habits of deliberate practice in students. Faculty in graduate forensic science degree programs must possess the tacit knowledge in their respective fields of expertise and may need their own programs of deliberate practice to achieve true expertise. The habits of deliberate practice that graduates can carry into their further careers could include ongoing forensic research, and critical reviews of completed cases. Other approaches to continuing deliberate practice will also be discussed.

Tacit Knowledge, Deliberate Practice, Expertise

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