



Forensic science. The importance of identity in theory and practice

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ABSTRACT

There is growing consensus that there is a crisis in forensic science at the global scale. Whilst restricted resources are clearly part of the root causes of the crisis, a contested identity of forensic science is also a significant factor. A consensus is needed on the identity of forensic science that encompasses what forensic science 'is', and critically, what it is 'for'. A consistent and cogent identity that is developed collaboratively and accepted across the entire justice system is critical for establishing the different attributes of the crisis and being able to articulate effective solutions. The degree to which forensic science is considered to be a coherent, interdisciplinary yet unified discipline will determine how forensic science develops, the challenges it is able to address, and how successful it will be in overcoming the current crisis.

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1. Introduction

Forensic Science has been the subject of intense global scrutiny in the last ten years. Key reports from the US and the UK have included the National Academy of Science [1], the Law Commission [2], The annual reports of the UK Forensic Science Regulator [3–6], the UK Government Chief Scientific Adviser annual report [7], the US PCAST report [8], successive UK House of Commons Science and Technology Committee [9–13], and the House of Lords Science and Technology Select Committee [14]. The scope and remit of these different reports has been varied, but one issue on which they agree is that forensic science is facing significant challenges locally and globally and 'profound changes to funding and governance are required to ensure that forensic science survives and begins to flourish rather than lurching from crisis to crisis' ([6]:3).

2. Forensic science in crisis?

The most recent inquiry by the House of Lords [14] was distinctive in taking a broad remit to address the whole ecosystem of forensic science (from crime scene to court). In so doing it brought together voices from a broad range of relevant domains (the police, advocates, judiciary, scientists, researchers, government ministries and policy makers). While the focus was on England and Wales, core themes that came out of the inquiry included the current lack of oversight, accountability and responsibility for

forensic science; the impact of the instability and unsustainability of the market for forensic science provision; and the challenges around agreeing, achieving and enabling quality standards; how science is used and understood within the justice system; and in supporting and enabling technological developments and foundational research in forensic science. These challenges affect different stages of the forensic science process [15,16]. For example, the current forensic science market in England and Wales has profound impacts on what materials are collected from a crime scene and which are not; what tests are commissioned and which are not; how those tests are carried out; and how the findings are ultimately reported. It is also possible that how science in court is understood can have an impact on the weight assigned to science evidence in a case, as well as the nature of the requests for additional materials (such as digital evidence from a tablet device) and the timeframes given for the production of those materials for a court [14].

It is clear that these challenges are systemic issues that need to be addressed for forensic science to develop and deliver the science that is needed to contribute to the robust delivery of justice. There are however, two critical factors that have exacerbated these challenges and arguably brought the system to the point of 'crisis' [14]. First, the lack of resources and successive funding cuts experienced across the whole sector (not only in policing and the courts but also in forensic service provision and research) [5,17,18]. The second factor that has emerged is that the crisis conditions are, at least in part, due to the loosely or even undefined nature of the identity of forensic science outside of the discipline. A contested identity of forensic science leads to different assumptions about

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what forensic science is, what it should be, and what it is for. This can result in different sectors and stakeholders holding different views of what the crisis 'is', what its constituents are, and therefore the best solution(s). After all, if it is not possible to agree on the diagnosis, it is difficult to agree the best treatment.

3. How have got here? The importance of identity and epistemology

The term used to name a discipline will define what that discipline is, sets a trajectory for how it will evolve, and shapes the perspectives of both those within and those outside the discipline [19]. Therefore, the name of a discipline, and its identity, is core to its credibility, strategic importance and therefore to its future. Forensic science has evolved as a field of enquiry over time and is often considered to be a 'patchwork of sciences' that can be applied to questions pertinent to forensic investigations [20]. It is often referred to as 'forensics' or the 'forensic sciences' to convey the premise that it is a multidisciplinary field that takes methods and techniques from 'parent' or 'core' sciences and applies them to 'forensic' questions.

3.1. Forensics

The term 'forensics' is challenging nomenclature. Technically 'forensic' is a term originally used as an adjective to describe 'belonging to, used in, or suitable for the courts'. As a result, the term 'forensic science' came to be used to describe the science applied to questions of law. However, alongside 'forensic science', 'forensics' has become established as a term, and generally speaking it is often used as a synonymous (but shortened) version of 'forensic science', even though the term in and of itself is arguably (technically) meaningless.

'Forensics' has come to have its own (often contested) meaning. While it is still used interchangeably with 'forensic science' in many instances, a 'forensics' model has emerged within forensic science that has become a dominant approach, and understanding of, the identity of 'forensic science' [16]. Within 'forensics' the focus is predominantly upon how parent disciplines (such as chemistry, biology, computer science, geology) can assist in the exploitation of evidence within the criminal justice system. In this approach, the crime scene is considered to be a distinct activity generally addressed by the police in an operational and processing capacity [15,16], and often these activities are directed at answering questions of source and identity. As a result, 'forensics' is now a widely used term within policing. However, this can convey a narrow remit for forensic science that primarily addresses the detection of forensic materials (source attribution), rather than the whole crime reconstruction process that incorporates a consideration of activity and offence level propositions [21,22] within the matrix of multiple stakeholders and external factors that frame the deployment of forensic science from crime scene to court [15,23].

3.2. Forensic sciences

The term 'Forensic Sciences' communicates a collection of applied 'core sciences' and therefore a 'field of interest', rather than a clearly defined discipline in its own right. Taking this approach is attractive because it addresses the operational needs that require answers to the 'what' and 'who' source questions in crime detection (what is this particle made of? who left this DNA profile?). A focus on these operational needs also leads to valuable developments in terms of technological advances to achieve those answers more quickly and accurately (for example enabling rapid DNA analysis in a custody suite, or real time fingerprint analysis).

However, there are two issues with this approach or 'model' of Forensic Science. First technologies are often transposed in to a 'forensic' problem without sufficient regard for the specific context in forensic reconstruction [15]. For example, consider the development of a powerful new technique for detecting trace amounts of material to distinguish between materials from different locations. However, the new technique requires a long sample preparation time, and an expensive piece of equipment that is not currently in standard forensic science laboratories. The cost implication of both of these attributes is likely to make the use of this breakthrough new technique unlikely (at least in the short term) [24,25]. While the new technique that has been developed addresses the 'forensic problem' (of distinguishing between materials from two locations) in isolation, it can not be considered to be 'forensic science', because the research has been designed in a way that is not sensitive to the context in which the new technique needs to be employed (ie it does not address the constraints of finance, time and personnel inherent to forensic science). The second issue is that considering Forensic Science as the 'forensic sciences' removes the possibility of a coherent and truly interdisciplinary approach for the scientific endeavour of crime reconstruction and evaluation [15,16,26]. It presents a very narrow view of forensic science, and one that constrains forensic science to a limited range of activities (usually related to the crime scene and analysis of specimens for forensic service delivery), and prevents a full consideration and appreciation of the contribution of science to the complex ecosystem of the justice system. As such it becomes very difficult to offer a comprehensive understanding of the value of forensic science [27,28] which has significant implications for where investment of resources is channelled.

3.3. Forensic science: A fragmented ecosystem

The identity of what forensic science 'is' is therefore, contested. However, what forensic science is 'for' is equally contested. Through different lenses, forensic science is considered to be a service, a science, a practice, or evidence. As a result of this identity crisis, forensic science is a highly fragmented ecosystem. This can be seen at the small scale, in an individual case where the 'atomisation' of the forensic science process means that different individuals and institutions are responsible for distinct parts (for example, one team addresses the scene, one scientist looks at trace evidence on one exhibit, a different scientist in a different institution deals with the DNA analysis from a different exhibit), rather than having a harmonised approach [23,29]. It is also seen at the larger scale in the fragmentation of forensic service provision in the UK with both in-house police and private company providers of forensic services. In addition investigations are often carried out in a piecemeal way with a lack of coherence between investigations and the courts [14].

Within the research domain this identity issue is also evident. What forensic science is considered to be for has created tensions over whether the purpose of forensic science research is primarily for developing analytical or technological solutions for investigators or service providers, or whether there is also value in undertaking foundational science that develops theory to underpin the whole forensic science process from detection to evaluative interpretation. This lack of clarity has led to a situation where it is often unclear where responsibility for research and development belongs in forensic science, and therefore who is accountable and responsible for it.

Given the fragmented nature of the ecosystem, it is therefore perhaps not surprising that forensic science is facing such significant challenges. Without a coherent identity of what forensic science is and what it is for, it is difficult for forensic science to fit into

the existing structures that nurture and enable its services or its research and development [30]. Therefore, articulating the identity of forensic science, and agreeing the nature of the discipline is critical to its future, and certainly not merely a matter of semantics. Given the breadth and diversity of forensic science this is not something that can be articulated from one quarter. It will require a collective approach that brings together the breadth of perspectives that forensic science incorporates. This is something that will require incubation and space for ideas to evolve for a consensus to be reached.

3.4. Forensic science: a coherent discipline

To pave the way for that collective approach to consensus, there is however, value in taking stock of where forensic science is currently. It is possible to observe in more recent times an emerging more coherent identity of 'forensic science' into a clearly defined discipline with all the hallmarks of a 'subject' [31,32]. It has a broadly understood name (there are job titles and building names that include 'forensic science'), it has professional societies, a large number of university courses, and an internationally peer reviewed body of published literature with increasingly distinct research methods and hypotheses [33]. Concomitantly, it is possible to observe a transition from forensic science as the application of parent sciences to a 'forensic problem' towards a more distinctive, unified interdisciplinary discipline.

As a coherent distinct discipline, forensic science it is possible to see the common principles and processes across its different domains (such as DNA, trace evidence, digital evidence). As a single discipline of Forensic Science (albeit a truly interdisciplinary one), it is possible to offer:

- The identification, and articulation of the foundational and overarching principles (reconstruction, detection and prediction) processes (authentication, identification, classification, reconstruction, and evaluation), and activities (survey, preservation, examination, documentation, analysis, integration, and interpretation) of forensic science materials.
- The consistent, reproducible and transparent application of the common principles and processes of forensic science that enables evidence-based practice (such as [34–37]).
- A discipline that can consider physical and digital evidence within the same coherent discipline (i.e. as part of a common framework with shared forensic principles, processes, activities to underpin research and the practice of forensic science) (see [34]).
- A discipline that can address and incorporate the complexity of the whole forensic reconstruction process by addressing the physical, human and digital environments and the theoretical and practical requirements [38].
- A discipline that can address the whole process from crime scene to court (to include source attribution as well as activity level and offence level propositions) in forensic reconstruction theory and practice, that creates collaboration between the diverse stakeholders (science, policing, government, policy, law) [15,16,23].

As a single coherent discipline Forensic Science is able to articulate the priorities for both technological developments to answer the questions of 'what?' and 'who?' as well as the foundational research that will answer the questions of 'how?' and 'when?'. In addition, it is able to incorporate the considerations of human decision making, context, and evaluative interpretation, and uncertainty. It is also able to fuel the development of new theory and lay foundations for the advances necessary to face the challenges

currently on the horizon, and those further into the future, by offering the full spectrum and capability of science to the holistic and complex ecosystem of the justice system.

Considering the nature of forensic science as a coherent discipline in this manner is arguably a valuable step towards developing consensus as to what forensic science 'is', and critically also what forensic science is 'for'. Developing an overarching understanding of the practice of forensic science needs to include both the undertaking of casework and delivery of science 'services' to support the justice system. It also needs to include the practice of research to develop new tools and theory that addresses each stage of the forensic science process and ensures the health of the innovation pipeline.

4. Conclusion

It is clear that there is growing disquiet about the crisis faced in forensic science. The complexity of the ecosystem means that this crisis has many symptoms and identifying the root causes is still very much an ongoing work in progress [14,39]. However, articulating the identity of forensic science across that ecosystem is key so that it is possible to not only articulate the different facets of the crisis that is faced, but also articulate cogent solutions. The lack of resources and funding to date is without doubt a significant exacerbating factor, but the power of identity in forensic science (and the implications of a contested identity) are clear and so it has never been more important to adopt a broad yet defined articulation of what forensic science is and what it is for. Forensic Science is a coherent interdisciplinary discipline, and as such is very well placed with the tools necessary to deal with the complex matrix within which it must operate. Reaching consensus on its identity and communicating it in ways that are meaningful to different audiences, yet are consistent across the justice system, is going to be key to how forensic science develops, the challenges it can address, and how agile it will be in facing the challenges that are just emerging on the horizon.

Declarations of interest

None.

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