

Review Article

Does the Term “Education” Need to be defined as it relates to Rule 702?

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Citation: Rinehart DJ (2017) Does the Term “Education” Need to Be Defined as It Relates to Rule 702?. Forensic Stud 2017; J103. DOI: 10.29011/FSTD-103.100003

Received Date: 21 December, 2017; **Accepted Date:** 22 March, 2017; **Published Date:** 28 March, 2017

Abstract

Law enforcement or police experts using scientific principles are being scrutinized due to lack of quality and minimal educational standards from the minimal educational requirements found in the hiring process. Entry level scientists or forensic experts are required to have a bachelor's degree with an emphasis in chemistry, biology, or biochemistry but there is no requirement or standard for law enforcement on minimal entry level educational requirements. Education becomes the means of assessing whether a witness is qualified to testify under the requirements of Rule 702. This article questions if there is a need to clearly define the term education as education pertains to Rule 702 or determine if there is a need to establish a minimal standard of an educational requirement of a witness in order to testify as an expert in the court of law as education pertains to Rule 702.

Keywords: Rule 702; Expert; Law Enforcement; Education

Introduction

Researchers have studied the implications of police officers who do not have a college degree and how the lack of a degree affects their job performance. Most police agencies in the United States do not require a college degree in order to be hired although some formal education or military service is preferred [1]. Due to lack of quality and minimal educational standards, law enforcement or police experts using scientific principles are being scrutinized in the court of law [2].

During the 20th century of court testimony under Frye guidelines, the trial court qualified an expert witness grounded upon their knowledge, education, proficiency, experience, and training, while also establishing how the testimony relates to the general acceptance within the scientific community. The expert may have reached accurate conclusions but were not held accountable on articulating how they reached their interpretation through a scientific and systematic methodology. The 21st century began with new guidelines written into the Federal Rules of Evidence, Rule 702, and in most State Rules of Evidence. Rule 702 now necessitates the trial court to consider if the testimony and theory presented can be verified, if the theory has been exposed to peer-review, if there is a recognized rate of error, and the general acceptance from the scientific community of the technique in question [3]. Rule

702 implies that in order to comply, the expert will need to think and respond as a scientist [4]. Law enforcement officers are not scientist but they are now required to testify using scientific measures. Law enforcement officers generally are not required to have a college degree in order to be hired, but in forensic laboratories, scientists are required to have a college degree [1]. Many forensic laboratories require all their employees to have at minimum, a college degree, in order to gain accreditation. Researchers have acknowledged that other than the field of DNA, experts are lagging in the ability to comply with Rule 702 but there is no research to the conundrum of law enforcement experts who do not have a college degree testifying as a scientist [5].

One of the criteria of Rule 702 that allows for a witness to be qualified as an expert in the court of law is through their education. Professional designations assist experts in proving that they are qualified to be an expert when they possess specialized training, education, and experience. An expert will need to show they are capable of performing in their field of study and education becomes a valid credential [6]. Formal education should be used when an expert is accredited in their field of study during qualifying questioning by attorneys in court. Evidence of being an expert often can be found with education and degrees [7]. In a court of law, Rule 702 allows for a witness to testify as an expert when they can explain how their hypothesis was used and as such, implies that there is an error rate, confidence level, and that reliable methods were used to come to a decision or opinion.

The problem is that Rule 702 in the Rules of Evidence does not specify or define the level of education required yet lists education as one of the criteria used to qualify a witness as an expert [2,6,8,9]. Evidence of being an expert can be found with education and degrees [7]. Based on previous research measuring the characteristics of an expert witness, minimal education is presumed to be a bachelor's degree [10]. In order to show that an expert has expertise in their respective field, education is a credential used by attorneys through the voir dire process [6]. Education should be used when an expert is accredited in their field of study during qualifying questioning by attorneys in court [11]. The educational credential is a specific qualification point in Rule 702 that allows the witness to testify that their theory used to render an opinion has been scientifically tested and the methods are reliable, standards and controls have been maintained, the theory has been peer reviewed and published, the potential error rate of the methodological process is known, and whether the theory and methods are generally accepted by the scientific community. Scientist and law enforcement officers are testifying as forensic experts but the educational credentials to enter their respective fields are different. Law enforcement or police experts using scientific principles are being scrutinized due to lack of quality and minimal educational standards from the minimal educational requirements found in the hiring process [2]. Entry level scientists or forensic experts are required to have a bachelor's degree with an emphasis in chemistry, biology, or biochemistry but there is no requirement or standard for law enforcement on minimal entry level educational requirements. Education becomes the means of assessing whether a witness is qualified to testify under the requirements of Rule 702 [9].

The question at hand is to determine if there is a need to clearly define the term education as education pertains to Rule 702 or determine if there is a need to establish a minimal standard of an educational requirement of a witness in order to testify as an expert in the court of law as education pertains to Rule 702. Education is one criteria requirement of Rule 702 in order to establish that an individual is an expert in their field of study and be recognized as an expert in the court of law. Attorneys must ask the appropriate questions of credentials to witnesses and then be acknowledged by the Judge as an expert in order to testify as an expert. The educational background is one area of the questioning an attorney should ask a potential expert witness.

Background

The legal system in the United States along with the rule of law has evolved for centuries from a society of common laws to what is current in the 21st century of specialized knowledge and many specializations. As such, our juries and judges should be expected to have specialized knowledge to understand testimony but the reality is that neither do and they are required to make the final decision as to guilt or innocence [12]. The court system is an adversarial system and when the two competing sides produce

testimony that the judges or juries cannot make the proper decisions due to their own lack of education in the matter before them, they often defer their decisions to those of an illogical foundation. However, in other rulings by the Supreme Court, the judge and juries are to find their own unique or respective ways of obtaining the proper knowledge to make a proper decision and not to make a decision based on their own intuition or other emotions that may or may not be logical [13]. In addition, the same judges and juries are expected to recognize biased testimony from experts as the experts adjust their testimony as to whether they are testifying for the prosecution or defense attorneys [12]. Through the nature of discovery, scientific evidence is presumed to be unbiased and a valuable asset in court proceedings. Yet, scientists are at times, retained for litigation purposes and for several reasons could become consciously biased [13].

With respect to law enforcement, prosecutors, and the courtroom, science has moved up drastically in standing. Scientific principles are now the standard for which investigative tools are scrutinized [2]. Expert witnesses who work in laboratories have been known to commit fraudulent acts and fraudulent testimony causing not only their opinion to be questioned but also questioning whether scientific principles are indeed accurate [6]. Currently, due to requirements of Rule 702, experts and the crime laboratories are now being scrutinized by their lack of quality and minimal methodologies that have been established [2]. One of the requirements of Rule 702 which defines an expert as a qualified witness is through their formal training and education. Studies question the basic requirements for education only to find that there is no standard of minimum qualifications but the studies do show a high prevalence toward a bachelor's degree in business and science specializations [8]. Research has fallen short of the causal elements to determine an expert witness favoring further studies [14].

Education and training within law enforcement are continuously being reviewed and reformed while researchers continue to study areas where higher education is beneficial to police officers [15]. The law enforcement community continues to resist higher education and higher education among the officers as the law enforcement community views law enforcement as a vocation while acknowledging the need to critically think, problem solve, and understand the global nature of the profession [16]. Research has shown that in order to heighten an officer's performance ability, higher education is essential and valuable [15]. Officers who are in a specific role such as a forensic expert, increased performance due to higher education improves their competence levels [16].

Police departments globally are expanding their training and education of their officers [15]. Most of this training involves correcting the actions of officers found guilty of misconduct as well as community and local societal issues that affect the police department. As the global nature of law enforcement expands, training

of police officers is trending toward transnational and international crimes. Officers and police departments separate higher education and in-service training citing that there are limitations to the training higher education supplies. In order to show that a police officer is an expert and has expertise in their respective field, formal education is a valid credential [6]. Evidence of proficiency is found through education and degrees regardless of where the degree is obtained.

Scientists prove their results through reliability standards and the validity of their testing of scientific evidence in order to obtain the truthful results. Rule 702 requires all experts who testify to base their testimony on facts, their testing can be duplicated and their original data is available, and that the results are reliable [17]. Rule 702 also requires the methods and principals used by the expert are scientifically accepted [3]. The forensic expert is then required to show what the established protocols were used when they used their equipment and instruments and then the expert will have to show how their results were validated with the proper reference and standardized materials. Beyond all of this, the expert will now have to show the relevance the evidence has toward the facts and facts of the case before the court [4]. In order to show that the proper applications have been met, all of the policies and procedures set by their agency or entity have been followed and that the expert can show proficiency within their respective discipline and has maintained their proficiency [6].

The area of science that has been able to find a direct connection of a piece of evidence to a specific person has been DNA. With any forensic discipline that is used and used in court where forensic evidence is pivotal, there must be an association with scientific methodology that is reliable. In addition, it is required that any interpretations that are opined that could contain errors must be supported with proven procedures and approved standards within the specific scientific discipline [18]. Unsubstantiated statements of a zero error rate with an expert's testing have been made but have also found there were no approved standards. When these zero error rates are opined in court, experts and attorneys explain these error rates as human errors and the experts have misinterpreted the data rather than explaining the error rate found within the scientific methods that were approved and used within the discipline [19]. Rule 702 requires that the scientific error rate be established and proven rather than establishing how many errors the expert has made interpreting the data or for example, how many fingerprint matches have not been correct due to an error with the examiner making the mistake [20]. Many experts claim that since they have not made a mistake interpreting the data that the error rate is zero and the confidence level is 100% rather than expressing the scientific error rate and confidence level of the process in which they interpret and opine on the results [20].

Forensic examiners in the discipline of bloodstain pattern

analysis continue to use probability and statistics to prove that the actions of the accused were not just random but rather a deliberate act. Statistics is based on a paradigm of procedures and applications of the principals of mathematics [21]. By using statistics with bloodstain pattern interpretation, evidence is interpreted by developing a hypothesis and minimizing and explaining errors in the overall analysis conducted. Bloodstain pattern analysis also has been found to utilize the principals of fluids in motion, applying those principals to blood, and showing that when force is applied to blood, the blood reacts differently than other liquids. The areas of viscosity and surface tension are used and explored when the human body has an exposed wound with blood freely flowing as the blood travels to the lowest level available before falling off onto a surface below. These same principals are used to explain why a blood drop remains spherical while in flight and the dynamics and shape of the blood drop change when outside forces interfere such as gravity, wind, or resistance. Blood drops have been shown to reach a finite size through displaying that a height of six feet, the blood drops will reach their terminal velocity causing their size to be at their greatest [22]. Geometry is used to explain that when a drop of blood strikes a surface at an angle, the ellipse is found in conjunction with a width-length ratio to establish the angle of impact. The purpose of establishing the angle of impact of a bloodstain through geometric processes is to determine in a three dimensional space the area of origin [23]. Since these mathematical equations and processes are absolute, the analyst must ensure that their measurements are as accurate as possible or the analyst may find that they have become the source of error. The errors then made by the analyst can possibly become type I errors due to biased results [21].

In most scientific cases, any errors found are found to be with the limitations of the scientific testing that needs to be done and that are directly found in the process of obtaining results. For example, a false positive found in testing of blood may be that the proteins found in vegetables are the same as those proteins found in human blood. The limitations of the testing, or field test kits are really in error rather than the results. The criminal justice system and the courts have evolved and held on to traditions and beliefs that are hard to change even when these entities argue for the scientific community to step up and authenticate each of the respective disciplines [5].

Forensic experts are required by Rule 702 to show how their testimony is valid and reliable. The experts will have to explain their error rates through statistical data. The statistical data found in statistics will need to be explained but the specific vocabulary found with statistics such as population, sample, data, data sets and variables will also have to be explained [21]. Variables are important in science and in the discipline of bloodstain pattern analysis as the bloodstain pattern analyst may need to understand the variable that blood thinners were used by the individual who deposited the

blood being analyzed and the effects the blood thinner may have on the constant of bloodstain pattern shapes [23]. Variables such as the material a bloodstain strikes, either smooth or hard, change the shape of the bloodstain rather than the constant of how a bloodstain shapes on the hard or smooth surface [24]. Therefore, the bloodstain pattern analyst will have to explain the error rate in the testing in order to become an expert as required by Rule 702 [8]. For example, an analyst will have to explain the error rate when attempting to determine the angle of impact of a drop of blood. Although the analyst may claim that the stain struck the surface at a twenty degree angle, the process by which they derived that conclusion must involve explaining the error rate based on a standard deviation [23]. Now the analyst will need to establish three standard deviations and after measuring 50 different bloodstains at twenty degree impacts find the standard deviation of .05. The analyst then concludes that the standard deviation for his analysis is 1.5 and applies this to his analysis; the analyst would conclude an error rate of ± 1.5 . Based on this conclusion, the angle of impact would then be expressed somewhere between 8.5° and 11.5° . Historically, statistical data have been reserved for persons who have at least a bachelor's degree from an institution of higher education or a scientist [21]. Rule 702 requires that statistical methods are established and shown in all relevant forensic disciplines such as bloodstain pattern analysis regardless whether the person testifying is a scientist or a police officer [21].

Research from the National Academy of Sciences have found that scientific or forensic disciplines that primarily deal with empirical and systematic research are failing and cannot show that scientific principals are being used. The failure has been linked to being unable to validate their basic techniques and these disciplines cannot demonstrate why there cannot be any validation [5]. In addition, peer review becomes difficult when forensic disciplines are used in the field of law enforcement due to the lack of published literature and research [14]. Historically, crime laboratories in the early 20th century were staffed with police officers as they were not research laboratories with scientists [6]. The training the officers received in these early crime laboratories was on-the-job training rather than theoretical and scientific training through education from an institution of higher education. Since forensic disciplines utilized by and within law enforcement have been found to be lacking in validated scientific methods, fulfilling the requirements of Rule 702 have been challenging. As a result, empirical proof cannot be shown as the officers fall back and rely on illogical deductions [14].

When empirical studies are absent or have not been completed, the explanation of validity and reliability should not fall back to the experience of the analyst. Proper techniques must be displayed and repeated when an analyst proves reliability and validity with their analysis. When the analyst finds that their hypothesis

is proven incorrect or find conflicting results due to the failure of techniques, the experience of the examiner should not be allowed to override scientific principals as required by Rule 702 [25].

Within the past two decades, forensic science has become an important field of study in institutions of higher education with hundreds of institutions offering course work in forensic science [26]. Laboratory services also expanded and there has become a need for additional personnel with a science education in areas such as chemistry, biology, and biochemistry [27]. Current research indicates that for the entry level forensic scientist the minimal educational requirement is a bachelor's degree with emphasis in chemistry [1]. Crime laboratory directors looking for personnel to fill positions such as handwriting/documentation analysis, serology, and fingerprints are looking for an educational component of a bachelor's degree with a science component. Forensic science educators and practitioners currently debate forensic science education within higher education [26].

Allowing forensic experts who do not have the educational background and cannot explain scientific principals such as validity and error rates fail to meet the requirements of Rule 702 [10]. Educational credentials that are obtained through a bachelor's program from an institution of higher education that contains coursework with research and statistics will allow the forensic analyst who is not a scientist to comply with Rule 702 and withstand to be scrutinized as a scientist [14]. When a law enforcement officer attempts to testify as an expert within a forensic discipline, rather than deemphasizing educational requirements, educational requirements should be emphasized so that the officer can introduce the forensic evidence properly [10].

Importance and implications

The 21st century began with new guidelines written into the Federal Rules of Evidence, Rule 702, and in most State Rules of Evidence. Rule 702 now necessitates the trial court to consider if the testimony and theory presented can be verified, if the theory has been exposed to peer-review, if there is a recognized rate of error, and the general acceptance from the scientific community of the technique in question. Rule 702 implies that in order to comply, the expert will need to think and respond as a scientist. Law enforcement officers are not scientist but they are now required to testify using scientific measures. Law enforcement officers generally are not required to have a college degree in order to be hired, but in forensic laboratories, scientists are required to have a college degree. Many forensic laboratories require all their employees to have at minimum, a college degree, in order to gain accreditation. Researchers have acknowledged that other than the field of DNA, experts are lagging in the ability to comply with Rule 702 but there is no research to the conundrum of law enforcement experts who do not have a college degree testifying as a scientist. Instructors of

criminal justice courses and those specifically assigned to teaching forensic science courses that include how crime scene units operate, how their tools are used, and instruct on courtroom testimony preparation, must demonstrate the student's need to understand the importance of receiving a college education that includes research and statistical courses so that law enforcement officers who are tasked to testify as an expert can satisfy the rules of evidence and be heard in a court of law. Most studies involve how an officer acts or has fewer complaints due to their educational degree. The implications of such research may cause the law enforcement community to ensure that their expert witnesses have a college degree and could possibly open the door for the trainers to have a master's degree, all in order to achieve meeting the requirements of the rules of evidence in a court of law. This would involve the promotional or transfer process to now require a college degree in order to be considered and this would also involve agencies in the local, state, federal and Indian tribe level. There appears to be a gap in literature concerning the educational requirements of police officers and how those education requirements are used with testimony in the court of law. The question remains, does the term "education" need to be defined as it relates to Rule 702?

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