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Analysis Of Methods For Determining The Gender Of Performers Of Manuscripts

Abstract. *The scientific article analyzes the methods of determining the gender of performers of handwritten texts, which are used in expert work in today's conditions. Based on the research of legal acts, scientific positions of leading scientists on this issue, an attempt was made to provide proposals for the latest developments in conducting the specified non-identifying research.*

Features of preparation of materials for classification of manuscripts into female and male are highlighted. On the basis of a thorough study of the conclusions of court experts, the typical signs of handwriting, which were most often used to determine the gender of the performer, were indicated. Attention is drawn to the factors that influence the change in handwriting, including psychological factors.

The need to develop research methods for texts of different scope and degree of elaboration is emphasized. The need to update the outdated methods of determining the sex of the performer in order to eliminate mistakes and errors in expert research has been proven. At the same time, it is emphasized that the existing methods developed on the basis of experimental studies of the Russian alphabet, which did not take into account the development of subsystems of Ukrainian spelling (graphics, orthography, punctuation), historical changes, etc., cannot be objective and be used when conducting forensic handwriting examinations.

The conducted scientific research is accompanied by statistical data obtained in the process of surveying law enforcement officers and analyzing expert opinions, as well as examples from expert practice.

Key words: *forensic handwriting examination, differentiation of manuscript texts by gender, non-identification studies, male and female manuscripts.*

Research Problem Formulation. Today's realities not only change social life, but also require the strengthening of the evidence base in the investigation of crimes. After the military invasion of the Russian Federation on the territory of our country, the emergence of relatively new forms of both collaborative activity and long-known offenses (fraud, theft, looting, etc.), an increase in suicides, etc., requires the application of expert practice, especially in the form of conducting forensic examinations as widely as possible. During the investigation of criminal offenses, an expert opinion can be decisive, therefore, it is important to carefully observe not only the procedural legislation, but also to fulfill the principles of completeness and objectivity of the research. However, experts note certain difficulties directly during the conduct of expert research, as well as when proving the results of an expert opinion in court. A significant obstacle during the performance of

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Declaration of Competing Interest

The author declare that they have no conflict of interest.



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АНАЛІЗ МЕТОДИК ВИЗНАЧЕННЯ СТАТІ ВИКОНАВЦІВ РУКОПИСНИХ ТЕКСТІВ.

Анотація: В науковій статті проаналізовано методики визначення статі виконавців рукописних текстів, які використовуються в експертній діяльності в умовах сьогодення. Базуючись на дослідженні нормативно-правових актів, наукових позицій провідних науковців з цього питання, була зроблена спроба надати пропозиції для новітніх розробок з проведення зазначених неідентифікаційних досліджень.

Висвітлено особливості підготовки матеріалів задля класифікації рукописів на жіночі та чоловічі. На підставі ґрунтовного вивчення висновків судових експертів зазначено типові ознаки почерку, які найчастіше використовувались для встановлення статі виконавця. Привернуто увагу до факторів, які впливають на зміну почерку, серед яких і психологічний.

Наголошено на необхідності розробки методик дослідження різних за обсягом та ступенем виробленості текстів. Доведено необхідність оновлення застарілих методик встановлення статі виконавця задля виключення помилок та похибок в експертних дослідженнях. При цьому акцентовано, що існуючі методики, розроблені на базі експериментальних досліджень російськомовного алфавіту, які не враховували розвиток підсистем українського правопису (графіки, орфографії, пунктуації), історичні зміни тощо, не можуть бути об'єктивними та використовуватись при проведенні судово-почеркознавчих експертиз.

Проведене наукове дослідження супроводжується статистичними даними, отриманими в процесі анкетування співробітників правоохоронних органів та аналізі експертних висновків, а також прикладами з експертної практики.

Ключові слова: судова почеркознавча експертиза, диференціація рукописних текстів за статтю, неідентифікаційні дослідження, чоловічі та жіночі рукописи.

expert activities is the lack of scientific developments and recommendations in certain directions, in particular, when solving non-identification issues in handwriting: differentiation of manuscripts by gender, age, profession during handwriting examinations.

Analysis of publications where this problem solution is initiated. In the scientific literature, identification issues are quite fully disclosed, that is, establishing the performer by handwriting. Certain aspects of non-identification studies of handwritten records have been repeatedly highlighted by prominent forensic scientists. Significant contributions to the study of manuscripts were made by: A.I. Vinberh, V.H. Honcharenko, H.I. Hramovych, A.V. Ishchenko, E.O.Ivakin, Z.I. Kirsanova, N.I. Klymenko, A.I. Kolonutova, A.A. Kupriianova, Z.I. Kirsanov, V.V. Lipovskyi, V.K. Lysychenko, A.I. Mantsvietova, A.I.Melnykova, Z.S. Milenevska, A.P. Moisieiev, V.F. Orlova, M.V. Saltevskiyi, N.H. Sakharova, M.Ia. Sehai, E.B. Simakova-Yefremian, I.Ia. Fridman, O.R. Shliakhov, S.A. Tsypeniuk, etc. However, the analysis of the materials of judicial and investigative practice shows the need to conduct non-identification questions, such as determining the sex of the performer, his age, profession, even handwriting defects, etc.

The Article aim. The purpose of this work is to research the methods of determining the performer's gender based on handwritten notes and signatures, to highlight problematic issues regarding its application, and to prove the need to update them.

Main Content Presentation. Conducting any expert research includes the preparation of materials, which is a painstaking, long-term process and often requires other forms of using special knowledge.

Scientists note that, first of all, the person who appointed the examination must not only correctly formulate the tasks of the examination, but also create real conditions for their solution. This is achieved, first of all, by providing in full the appropriate material evidence, comparative samples, other case materials containing "biographical" data on the origin and storage conditions of the objects under investigation. In case of complications during the preparation and processing of materials for examination, the investigator can always get advice from an expert institution, use the help of specialists.^{1,2}

In addition to the general requirements, the legal acts regulating the procedure for the appointment and conduct of forensic examinations provide that the document on the appointment of the examination should indicate the established special circumstances of the execution of the handwritten text, which could affect the change in the signs of the handwriting (unusual pose or unusual state of the executor etc). If there is evidence that the performer is a person with impaired coordination of movements, this should also be reported to the expert. In the case of execution of a handwritten text by an elderly or senile person, it is necessary to provide information about the year of his birth and state of health at the time of possible execution of the object of handwriting under investigation³.

But even under such conditions, it is often difficult to establish the performer based on handwritten notes due to the lack of comparative samples, their insufficient volume, incompatibility with disputed notes, unreliability of origin, etc. When establishing the author of the manuscript is not possible for the reasons indicated, the solution of non-identification issues, such as the classification of the manuscript by the gender of the

¹ Бідняк Г. С. Теорія і практика використання спеціальних знань при розслідуванні шахрайств: монографія. Дніпро: Дніпропетровський державний університет внутрішніх справ, 2019. 170 с.

² Бідняк Г. С. Особливості організаційно-підготовчих заходів до проведення почеркознавчого дослідження. *Науковий вісник Дніпропетровського державного університету внутрішніх справ: збірник наукових праць*. 2014. № 2 (71). С. 275-283.

³ Шляхов А. Р., Манцвєтова А. И., Орлова В. Ф. и др. Судебно-почерковедческая экспертиза. М.: Юрид. литература, 1971. 304 с.

Drobot Olha

**ANALYSIS OF METHODS
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author, namely whether the manuscript was written by a man or a woman, becomes of particular importance.

Classification studies always differ in complexity and subjective attitude of the expert. This opinion is also held by scientists who believe that all quantitative methods are designed only for modeling expert decision-making, and the selection of signs takes place on a subjective level, while it is impossible to achieve complete objectification of the expert's evaluation activity. As long as the process of identifying informative features remains at the qualitative-descriptive level, the research results, even with the help of methods based on mathematical modeling of the expert's evaluation activity, are still subjective and largely depend on the expert's qualifications. The primary task in the further objectification of the research process when solving classification tasks is to find ways to distinguish handwriting features, their formalization, which will provide the possibility of unambiguous perception of handwriting features by any expert.⁴

Previously, we have already raised the mentioned topic for the consideration of scientists and received the following results of a survey of law enforcement officers. Among the prescribed handwriting examinations, 60% are for the study of signatures, 27% for short manuscript texts, and 13% for medium and large manuscripts. However, as the analysis of investigative and judicial practice shows, if it is impossible to solve the identification tasks, the person who appoints the examination brings up for consideration the following issues: execution of disputed manuscripts by one person – 36%, establishing the sex of the executor – 23%, unusual condition of the executor – 18%, unusual performance conditions – 13%, etc.⁵

After conducting similar research five years later, we received similar data, which confirms the objectivity of the analysis and the relevance of the topic raised. Expanding the specified spectrum, we determined that in most cases, about 70%, the investigator was interested in establishing the professional and age affiliation of the performer in the decrees on the appointment of expert examinations at the same time as establishing the sex of the performer. In all analyzed conclusions, the result was the same - it is not possible to solve the issue. One of the examples from practice looks like this: «...Solve the question of which age group belongs to the executor of the handwritten notes in the receipt dated 00.00.00, which begins with the words: «Receipt. I am PIP...» and ends with the words «...in good memory», as well as in the contract dated 00.00.00., which begins with the words: «Contract. I PIP...» and ends with the words «...made in the presence of witnesses», is not possible.

The experts' explanations are well-founded. Determining the age of the performer of the handwritten text, there is currently no modified method for solving this issue. The age of the performer is determined by experts at the subjective level, depending on the stages of the formation of written-motor skills, that the formation of this skill ends at approximately 24-27 years, after which the handwriting remains stable for a long time (a person without violations of the writing-motor apparatus) until the emergence changes associated with the aging of the body.

In our opinion, establishing the professional and age affiliation of the performer based on the handwriting is very closely related to the differentiation of the performer by gender, it can significantly affect the

⁴ Про затвердження Інструкції про призначення та проведення судових експертиз та експертних досліджень та Науково-методичних рекомендацій з питань підготовки та призначення судових експертиз та експертних досліджень Наказ МЮ України від 08.10.98 № 53/5 URL:<https://zakon.rada.gov.ua/laws/show/z0705-98#Text> Редакція від 19.08.2022.

⁵ Івакін Е.О. Теоретичні та методичні питання неідентифікаційних досліджень в судовому почеркознавстві : автореф. дис... канд. юрид. наук: 12.00.09. Київ : 2003. 16 с. : URL:<http://library.univer.kharkov.ua/OpacUnicode/index.php?url=/notices/index/IdNotice:791108/Source:default>.



manifestation of certain features of handwriting, therefore it should be taken into account in the updated methods.

The analysis of the literature showed that all research works in the form of articles, textbooks, methods, directly or indirectly related to the raised topic, were carried out during the Soviet Union. Let's focus on some of them, which are widely used in expert practice.

Thus, for researching short manuscripts, a modified method developed in the 1980s by Z.I. Kirsanov and A.P. Rogozin, that is, a method of determining the gender of the performer of short handwritten texts using alternate information in upper and lower case letters. At the same time, 800 experimental samples of average or slightly higher than average handwriting were processed, which significantly narrows the scope of application of this technique and makes it impossible to process other handwritings in expert studies. Also, the results processed using outdated equipment and computing programs of Iskra-226 computer (which did not have the necessary computing resources) and ES-1055 are also questionable and require verification. The research work related to the search for criteria for distinguishing male and female manuscripts was based on the statistical analysis of handwriting features using the apparatus of pattern recognition theory (the method of optimal binary discrimination of classes). Later, the authors abandoned it and replaced it with «manual» decision-making.^{6, 7}

Of course, experts should be able to monitor the stability of a particular feature. But in modern life, for various reasons, including in connection with the spread of the use of electronic documents, handwriting with a low degree of production is more and more common. Currently, its differentiation is neglected, as well as signatures, which sometimes represent a very limited amount of graphic material. As a result, experts are forced to refuse to solve such issues.

Until now, forensic experts use the method of differentiating manuscripts into male and female,» developed by N.G. Kulagin. and A.I. Koltunova, developed in 1968 with further refinement in 1970. The method is designed for large-volume handwritten material (approximately one page or more), executed in unaltered handwriting. At the same time, data on the frequency of occurrence of handwriting signs in lowercase letters of the Russian alphabet were used. Statistic data in uppercase cursive letters were not studied. Even scientists of the Soviet era noted that the features of the design of cursive letters (the presence of monograms, multi-elements, etc.) in terms of complexity have greater identification significance than cursive letters.⁸ Also, the research was based on the processing of 480 experimental samples, which, in our opinion, requires expansion and additional verification in order to reduce the error.

In order to be able to apply the method, together with the handwritten text, scientists advise to study the signature if it forms a single handwritten material with the manuscript, that is, the transcription of the signature is literal or mixed with the display of essential features. You can expand the volume of the text at the expense of other records after checking for performance by one performer. An example of this can be one of the expert studies conducted at the expert institution of the Ministry of Internal Affairs

⁶ Дробот О.А. Вирішення неідентифікаційних завдань почеркознавчої експертизи: проблемні питання. Актуальні проблеми експертного забезпечення досудового розслідування : матеріали наук.-практ. семінару (Дніпро, 24 травня 2019 р.). Дніпро : Дніпроп. держ. ун-т внутр. справ, 2019. С. 55-58

⁷ Методика определения пола исполнителя кратких рукописных текстов. Учебное пособие, М., 1990 г., ВНКЦ МВД СССР., 185 с.

⁸ Модифицированный метод определения пола исполнителя рукописи по средневыработанному почерку. *Экспертная практика и новые методы исследования*. № 9. М. : ВНИИСЭ, 1982.

Drobot Olha

ANALYSE DES MÉTHODES DE DÉTERMINATION DU SEXE DES EXÉCUTEURS DE TEXTES MANUSCRITS.

Résumé : L'article scientifique analyse les méthodes de détermination du sexe des interprètes de textes manuscrits utilisés dans les activités d'experts judiciaires dans les conditions actuelles. Sur la base de l'étude des actes juridiques normatifs et des positions scientifiques d'éminents scientifiques sur cette question, on s'est efforcé de faire des propositions sur les derniers développements dans la réalisation de ces recherches non-identifiables.

Les caractéristiques de la préparation des matériaux pour la classification des manuscrits en féminin et masculin sont mises en évidence. Sur la base d'une étude approfondie des conclusions des experts judiciaires, les signes typiques de l'écriture manuscrite, qui étaient le plus souvent utilisés pour déterminer le sexe d'exécuteur ont été indiqués. L'attention est attirée sur les facteurs qui influencent le changement d'écriture, y compris les facteurs psychologiques.

La nécessité de développer des méthodes de recherche pour des textes de portée et de degré d'élaboration différents est soulignée. La nécessité de mettre à jour les méthodes obsolètes de détermination du sexe de l'interprète afin d'éliminer les erreurs et les erreurs dans les recherches d'experts a été prouvée. Dans le même temps, il est souligné que les méthodes existantes développées sur la base d'études expérimentales de l'alphabet russe qui n'ont pas pris en compte le développement de sous-systèmes d'orthographe ukrainienne (graphiques, orthographe, ponctuation), changements historiques, etc., ne peuvent pas être objectifs et être utilisés lors d'examen judiciaires d'écriture manuscrite.

La recherche scientifique menée s'accompagne de données statistiques obtenues au cours du processus d'enquête auprès des forces de l'ordre et d'analyse des conclusions d'experts, ainsi que d'exemples tirés de la pratique d'experts.

Mots clés : examen judiciaire d'écriture, différenciation des textes manuscrits par sexe, recherches non-identifiables, manuscrits masculins et féminins.

Drobot Olha

ANALYSE DER METHODEN ZUR BESTIMMUNG DES GESCHLECHTS DER AUSFÜHRER VON MANUSKRIPTE

Der wissenschaftliche Artikel analysiert die Methoden zur Bestimmung des Geschlechts von Interpreten handschriftlicher Texte, die in der Expertenarbeit unter heutigen Bedingungen verwendet werden. Basierend auf der Recherche von Rechtsakten und wissenschaftlichen Positionen führender Wissenschaftler zu diesem Thema wurde versucht, Vorschläge für die neuesten Entwicklungen bei der Durchführung der angegebenen nicht identifizierenden Forschung zu machen.

Hervorgehoben werden die Merkmale der Vorbereitung von Materialien für die Klassifizierung von Manuskripten in weiblich und männlich. Auf der Grundlage einer gründlichen Untersuchung der Schlussfolgerungen von Gerichtsexperten wurden die typischen Handschriftzeichen angegeben, die am häufigsten zur Bestimmung des Geschlechts des Darstellers verwendet wurden. Es wird auf die Faktoren hingewiesen, die die Veränderung der Handschrift beeinflussen, einschließlich psychologischer Faktoren.

Die Notwendigkeit, Forschungsmethoden für Texte unterschiedlichen Umfangs und Ausarbeitungsgrads zu entwickeln, wird betont. Die Notwendigkeit, die veralteten Methoden der Geschlechtsbestimmung des Darstellers zu aktualisieren, um Irrtümer und Irrtümer in der Expertenrecherche zu beseitigen, ist erwiesen. Gleichzeitig wird betont, dass die bestehenden Methoden, die auf der Grundlage experimenteller Studien des russischen Alphabets entwickelt wurden, die die Entwicklung von Subsystemen der ukrainischen Rechtschreibung (Grafik, Rechtschreibung, Interpunktion), historische Veränderungen usw. nicht berücksichtigten, kann nicht objektiv sein und bei forensischen Handschriftuntersuchungen verwendet werden.

Die durchgeführte wissenschaftliche Forschung wird durch statistische Daten begleitet, die im Prozess der Befragung von Strafverfolgungsbeamten und der Analyse von Expertenmeinungen sowie von Beispielen aus der Expertenpraxis gewonnen wurden.

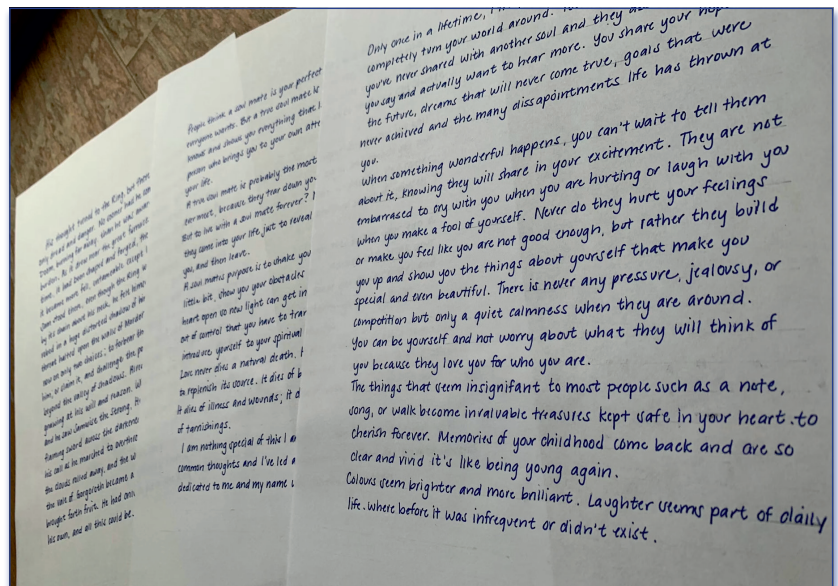
Schlüsselwörter: forensische Handschriftuntersuchung, Differenzierung von Manuskripttexten nach Geschlecht, Nicht-Identifikationsstudien, männliche und weibliche Manuskripte.

of Ukraine. Thus, during the performance of the multi-objective examination, one of the questions posed to the expert was: «Whose gender executed the handwritten text and signatures on the application on behalf of the city of L. in the name of the head of the labor and social protection department of the city. WITH.?» The expert established: «...When comparing the examined handwritten texts and signatures, a coincidence of the general and essential individual signs indicated above was established, which form an individual set of signs, sufficient for the conclusion that these examined handwritten texts and signatures were made by one person and in the future will be used as a single handwriting material. And then a modified method was applied and it was determined that the handwriting and signatures were probably done by a man.»

The analysis of the conclusions of forensic experts made it possible to identify more typical features characteristic of male and female performers, but with different coefficients, namely:

- different size of superscript elements in the letters «В», «б»
- the average size of the sub-line elements of the letters «р», «з»
- the location of the starting point of the movements when performing the first element of the letters «а», «д» - to the left
- unequal size of the superordinate element in the letter «й»
- different configuration of the superordinate element in the letter «й»
- loop configuration of sub-line elements of the letters «д», «й»
- the presence of the superscript part of the 1st element in the letter «р»
- lack of initial strokes in the letters «к», «н»
- lack of initial strokes in the letters «й», «ш», «й», «ц», «щ»
- the left circular direction of movement when performing the superordinate element of the letter «й».

After selection of informative differentiating features of handwriting, their coefficient is calculated. If the product of statistical probability is greater than one, then the text was written by a man, if less than one, then by a woman. Of course, the methodology analyzes each letter of the Russian alphabet with signs and the corresponding coefficient, however, as we can see, it is





possible to analyze the peculiarities of writing letters «i», «ї», «r», an apostrophe according does not have to the modified method.

It is important to note that all existing methods are developed only for Russian capital letters. Undoubtedly, Ukrainian literatures have certain similarities in writing, but in our opinion, there are enough differences that require additional research and evaluation of features.

Follow the appeal to Ukrainian spelling, in which there are many changes in various aspects: both in the form of simplifying the writing of individual elements of letters (for example, spelling norms dated throughout the years), and a return to the ancient traditions of using certain expressions, modern new terminology etc.

As you know, spelling consists of three subsystems:

graphics - letters used to denote the most typical sounds,
orthography - regularities of the combination of letters to convey the sound image of the Ukrainian language in writing,
punctuation - punctuation marks, with the help of which indicate the content and intonation division of the expressed opinion.⁹

Each of these subsystems changes over time, which affects the formation of a certain person's handwriting and must be taken into account during expert research.

It is impossible to ignore the fact that the negative impact of the ban on Ukrainian spelling left its mark on the truly Ukrainian language and naturally changed it. In 1876, the Russian emperor Alexander II passed an act according to which Ukrainian graphics were banned. Ukrainian texts, even those permitted by government censorship, had to be printed using the Russian alphabet. The modern edition of the Ukrainian orthography brings back to life some features of the 1928 spelling, which are part of the Ukrainian orthographic tradition and whose renewal has a modern scientific basis.

In phonetics and grammar, the Ukrainian language has more than twenty features in common with the Belarusian, Czech, Slovak, Polish, Croatian and Bulgarian languages. With Russian - only eleven. The attempt to convey the sound form of borrowed words or the peculiarities of their original reproduction led to the penetration of new sounds and their combinations, exotic grammatical phenomena into the Ukrainian language. At the same time, becoming part of the Ukrainian language system, these words gradually adapt to Ukrainian phonetics, morphology, spelling.¹⁰

Undoubtedly, all of the above must be taken into account when conducting scientific research and requires the implementation of updated methods, expanded, experimentally tested, taking into account spelling subsystems, historical changes, etc.

In this context, the peculiarities of psychological research should also be taken into account. Although criminologists have proven that when writing manuscripts, the performer has signs of both one and the other sex, but in a different ratio, psychologists claim that recently many men have become characterized by female psychological traits, and women - male. This further reduces the reliability of the expert opinion regarding the gender of the author of the manuscript.¹¹ This fact of the impossibility of distinguishing features characteristic of a certain category of persons does not allow to solve the issue categorically and requires additional comprehensive research.

Conclusions. Summing up, we note that the conclusions of forensic experts should be based only on scientifically proven, experimentally verified

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ANALIZA METOD USTALANIA PŁCI WYKONAWCÓW RĘKOPISÓW

Artykuł naukowy analizuje metody określania płci wykonawców tekstów rękopiśmiennych, które są stosowane w pracy eksperckiej w dzisiejszych warunkach. Na podstawie kwerendy aktów prawnych, stanowisk naukowych czołowych naukowców na ten temat, podjęto próbę przedstawienia propozycji najnowszego dorobku w prowadzeniu wskazanych badań nieidentyfikujących.

Podkreślono cechy przygotowania materiałów do klasyfikacji rękopisów na żeńskie i męskie. Na podstawie wnikliwego przestudiowania wniosków biegłych sądowych wskazano typowe znaki pisma, które najczęściej służyły określeniu płci wykonawcy. Zwrócono uwagę na czynniki wpływające na zmianę charakteru pisma, w tym czynniki psychologiczne.

Podkreślono potrzebę rozwoju metod badawczych dla tekstów o różnym zakresie i stopniu opracowania. Udowodniono potrzebę aktualizacji przestarzałych metod określania płci wykonawcy w celu wyeliminowania pomyłek i błędów w badaniach eksperckich. Jednocześnie podkreśla się, że dotychczasowe metody opracowane na podstawie eksperymentalnych badań alfabetu rosyjskiego, które nie uwzględniały rozwoju podsystemów pisowni ukraińskiej (grafiki, ortografii, interpunkcji), zmian historycznych itp., nie mogą być obiektywne i mogą być wykorzystywane podczas przeprowadzania kryminalistycznych badań pisma ręcznego.

Prowadzonym badaniom naukowym towarzyszą dane statystyczne uzyskane w procesie ankietowania funkcjonariuszy organów ścigania i analizowania opinii biegłych, a także przykłady z praktyki eksperckiej.

Słowa kluczowe: badanie pisma sądowego, różnicowanie tekstów rękopisów ze względu na płeć, badania nieidentyfikacyjne, rękopisy męskie i żeńskie.

⁹ Кулагин П.Г., Колтунова А.И. Экспертная методика дифференциации рукописи на мужские и женские, 1970 г., ВНИИ МВД СССР, 205 с.

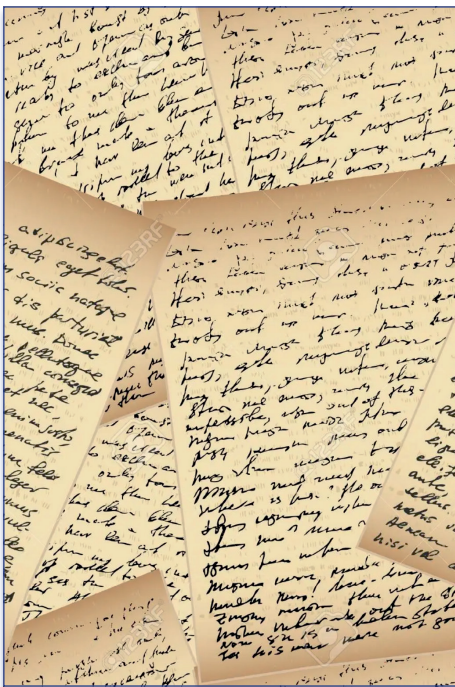
¹⁰ Український правопис URL:<https://mon.gov.ua/storage/app/media/zagalna%20serednya/Pravopys.2019/ukr.pravopys-2019.pdf>

¹¹ Івакін Е.О. Теоретичні та методичні питання неідентифікаційних досліджень в судовому почеркознавстві : автореф. дис... канд. юрид. наук: 12.00.09. Київ : 2003 . 16 с.

scientific developments, methods and at the same time contain complete and objective studies. Today, judicial and investigative practice proves the relevance of the raised topic. However, to meet these needs, there is an urgent need to develop the latest methods of differentiating manuscripts by the gender of the performer, which will be based on the peculiarities of writing written signs of the Ukrainian language, subsystems of spelling, historical changes, and also contain developments regarding the study of signatures and texts, different in scope and degree production taking into account the psychological features of performers of both sexes.

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