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## Trends in the Field of Questioned Document Examination

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**ABSTRACT:** In any professional field, observations of the current literature usually give an indication of the direction the field is taking. This approach has been formalized in the technique of content analysis. A content analysis of the literature in the field of document examination was made. The *Journal of Forensic Sciences* was chosen as the sample for this study since articles on document examination have been printed in every volume since the *Journal* was first published in 1956. The articles were studied and 30 categories were selected to represent the topics contained in the body of the literature. Topic selection was based on this writer's interpretation of the author's intent or emphasis in each article. An analysis of the results is included.

**KEY WORDS:** questioned documents, research, historical background

In any professional field, observations of the current literature usually give an indication of the direction the field is taking. This approach has been formalized in the technique of content analysis, described by Carney [1, p. 5] as "any technique for making inferences by objectively and systematically identifying specified characteristics of messages." Holsti [2, p. 9] argues further that

the case for designing content analysis to yield numerical data—although not necessarily solely in terms of frequency—is a powerful one. Foremost among the arguments is the degree of precision with which one's conclusions may be stated.

Budd et al [3] take a broader view and recognize that content analysis, which may in practice consist of title analysis, frequency counts, length of messages, or any other consistent measure, permits a systematic study of communications, whether the medium be newspapers, radio messages, political speeches, or journal articles.

The range of application of content analysis is indeed broad. Merritt, as cited in Holsti [2, p. 95], studied the community awareness of the American colonies by using content analysis of colonial newspapers from 1735 to 1775. He noted changes in awareness based on the frequency of occurrences of American place names.

Spotts [4] used the technique to analyze corporate recruiting literature directed toward graduating college seniors. He noted the frequency of different appeals, inducements, and motivators.

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In a direct historical analysis, Bruner and Alport [5] in 1940 inferred the direction of change in the field of American psychology by analyzing a sample of 50 years of psychological journal articles. This last study, published in the *Psychological Bulletin*, served as a general model. However, the three-person panel and reliability testing used by Bruner and Alport were eliminated in this simplified approach.

### The Sample

The *Journal of Forensic Sciences* was chosen as the sample for this study since articles on document examination have been printed in every volume since the *Journal* was first published in 1956.

The total number of articles in each volume was counted. The number of articles on document examination as a percentage of total articles was computed (Table 1). The total number of pages in each volume devoted only to journal articles was counted. The number of pages on document examination as a percentage of total pages was computed (Table 2).

The 23-year span of journal articles was divided into five time periods. Each time period consists of five years except for the last period, which represents three years. The five-year time period was chosen to represent one half a decade. The content analysis study by Bruner and Alport [5] covered 50 years with time periods of one decade each.

Table 3 shows the computation of articles on document examination as a percentage of total articles by time period. Table 4 shows the computation of pages on document examination as a percentage of total pages by time period.

### Classification

The articles on document examination were studied and 30 categories were selected

TABLE 1—*Document articles and total articles per year.*

Year	Volume	Total Articles	Document Articles	Document Articles as a Percentage of Total Articles
1956	1	40	3	7.5
1957	2	30	2	6.7
1958	3	32	3	9.4
1959	4	50	4	8.0
1960	5	35	3	8.6
1961	6	38	4	10.5
1962	7	38	3	7.9
1963	8	43	5	11.6
1964	9	50	5	10.0
1965	10	46	9	19.6
1966	11	48	5	10.4
1967	12	48	3	6.3
1968	13	42	3	7.1
1969	14	56	4	7.1
1970	15	52	3	5.8
1971	16	45	6	13.3
1972	17	71	5	7.0
1973	18	67	10	14.9
1974	19	106	4	3.8
1975	20	79	2	2.5
1976	21	103	6	5.8
1977	22	102	9	8.8
1978	23	103	5	4.8

TABLE 2—Pages devoted to document articles and total pages per year.

Year	Volume	Total Pages	Document Pages	Document Pages as a Percentage of Total Pages
1956	1	505	26	5.2
1957	2	499	30	6.0
1958	3	523	35	6.6
1959	4	503	43	8.6
1960	5	549	42	7.7
1961	6	511	43	8.4
1962	7	533	32	6.0
1963	8	582	58	10.0
1964	9	535	40	7.5
1965	10	494	81	16.4
1966	11	559	62	11.1
1967	12	557	43	7.7
1968	13	559	47	8.4
1969	14	558	35	6.3
1970	15	615	28	4.6
1971	16	534	75	14.0
1972	17	702	42	6.0
1973	18	477	69	14.5
1974	19	936	38	4.1
1975	20	756	19	2.5
1976	21	970	37	3.8
1977	22	856	63	7.4
1978	23	798	51	6.4

TABLE 3—Document articles and total articles per time period.

Time Period	Total Articles	Document Articles	Document Articles as a Percentage of Total Articles
1956-1960	187	15	8.0
1961-1965	215	26	12.1
1966-1970	246	18	7.3
1971-1975	368	27	7.3
1976-1978	308	20	6.5
Total	1324	106	8.0

TABLE 4—Pages devoted to document articles and total pages per time period.

Time Period	Total Pages	Document Pages	Document Pages as a Percentage of Total Pages
1956-1960	2 579	176	6.8
1961-1965	2 655	254	9.6
1966-1970	2 848	215	7.5
1971-1975	3 405	243	7.1
1976-1978	2 624	151	5.8
Total	14 111	1039	7.4

to represent the topics contained in the body of the literature. Topic selection was based on this writer's interpretation of the author's intent or emphasis in each article.

Document work deals mainly with handwriting identification and forgeries; therefore, these categories were not routinely checked. Specific words or phrases were not considered if they were extraneous to the main idea. The references to handwriting, forgeries, and other categories were included only if pertinent to the point the author was making in the article.

Theoretically an article could be entered under all categories or under none at all; however, in this study, the range of categories noted for each article is no less than one nor more than nine. Original categories that included only one or two articles were combined under miscellaneous.

The categories are divided among seven sections: the document examiner, the document examination, means of identification, differences in writing, methods of identification, illustrations, and other.

### *Document Examiner*

The document examiner section contains the categories pertaining specifically to the examiner.

1. Qualifications—The category of qualifications includes those articles with emphasis on the training, education, experience, and ethics of document examiners. Graphology is included here since it is an integral part of training in Germany [6] even though it is not a part of training in the United States.

2. Instruction—Articles in the instruction category were written for instructional purposes and were not reports or essay-type articles.

3. Court testimony—Articles included in the court testimony category contained information for the expert witness.

4. Court rulings—Articles with references to Supreme Court cases establishing precedents were included in the court rulings category.

5. Value of research—Those articles that stressed research to increase the knowledge of document examiners were included in the category of value of research.

### *Document Examination*

The section on document examination contains the categories pertaining to the work of the examiner.

6. Handwriting—The handwriting category included articles on comparison and identification studies of handwriting as distinct from hand printing.

7. Hand printing—Papers dealing with the comparison and identification of printing, as an entity separate from handwriting, were listed under the category of hand printing.

8. Typewriter—Papers dealing with the operation, comparison, and identification of typewriters and typewriting were classified under the typewriter category.

9. Ink—The differentiation and comparison of ball-point pen inks and carbon- and iron-based inks were discussed in articles in the ink category.

10. Paper—The paper category included articles dealing with methods of paper characterization.

11. Adhesives—Papers containing information on the comparison and identification of adhesives were included in the category of adhesives.

12. Copy equipment—Articles on materials such as "Autopens," rubber stamps, copy

machines, facsimile recorders, carbon paper, carbonless forms, correction tape, and copy machine papers were included in the copy equipment category.

### *Means of Identification*

Five categories composed the section on means of identification, which encompassed articles on comparison techniques used in identification.

13. Characteristics—The characteristics category included articles on such features of handwriting as alignment, uniformity, legibility, speed, beginning and ending strokes, connecting strokes, spacing, hesitation, shading, line quality, pen lift, patching, re-tracing, and letter design.

14. Pressure—The pressure category included those articles that dealt with the effect of the pressure of the writing instrument on the appearance of the writing and the indentation on the paper.

15. Sequence—The sequence category included articles on the order in which one ink or pencil line, from handwriting, typewriting, or rubber stamps, is placed over another line or area.

16. Exemplars—The exemplars category included articles on the importance of obtaining sufficient known handwriting and typewriting standards for comparison with questioned or disputed documents.

17. Classification—The classification category included articles detailing systems to classify handwriting, typewriting, and check-writing characteristics.

### *Differences in Writing*

The section on differences in writing contains four categories of events that influence the style and skill of handwriting.

18. Disguise—Included in the disguise category were articles on the use of disguised writing in both questioned materials and requested exemplars.

19. Deterioration—Included in the deterioration category were articles on deterioration in the skill of the writer caused by illness, old age, alcohol abuse, medication, and drugs. Also included were articles on assisted and deathbed handwriting.

20. Geographic areas—Included in the geographic areas category were articles on the different handwriting systems used in various geographic locations.

21. Forged documents—Included in the forged documents category were articles on changes in handwriting style and alterations on such documents as medical records.

### *Methods of Identification*

The section on methods of identification included five categories detailing the methods and equipment used to identify documents.

22. Electronics—Those papers that discussed the use of the gas chromatograph, electrophoresis, neutron activation analysis, spectrophotometer, scanning electron microscope, facsimile recorder, photocopiers, computers, psychological stress testing apparatus, and other electronic equipment not included in the infrared and ultraviolet category were assigned to the electronics category.

23. Infrared and ultraviolet—Those papers that discussed the use of Thermo-fax® equipment, infrared image converters, infrared luminescence, high and low band ultraviolet fluorescence, infrared spectrophotometry, infrared reflection photography, dichroic

filters, and the Video Spectroscanner [7] were assigned to the infrared and ultraviolet category.

24. Chemical analysis—Those papers that discussed the use of nonelectronic instruments and paper, disk, color stain, and thin-layer chromatography were assigned to the chemical analysis category.

25. Controlled research—Those studies having controls or established baselines were assigned to the controlled research category.

26. Inferential statistics—Those papers that used statistics to draw inferences about hypotheses were assigned to the inferential statistics category.

### *Illustrations*

The section on illustrations contained three categories of methods used to explain graphically or to simplify the emphasis of the article.

27. Graphics—Articles containing charts, photographs, tables, and graphs were included in the graphics category.

28. Photography—Articles emphasizing the use of photography to record documents, to aid research, and to prepare court exhibits were included in the photography category.

29. Single cases—Articles emphasizing one case history were included in the single cases category.

### *Other*

Those articles that emphasized a point not included in the 29 specific categories were grouped in the miscellaneous category. This category was further subdivided into time periods. During 1956 to 1960, there were articles on the function of the Postal Inspection Service, anonymous letters, punctuation, suicide notes, and a comparison of the handwriting of twins. From 1961 to 1965 articles were published on anonymous letters, indented writing, counterfeit warrants, and pencil lead. Papers on the handwriting of blind people, printing processes, form blindness (lack of perception), and handwriting from the nondominant hand as compared with that from the dominant hand appeared during the period 1966 to 1970. From 1971 to 1975 articles were published on silicone rubber for casting, measuring color by photography, the privilege doctrine for expert witnesses, certification of document examiners, and the possibility of a checkless and cashless society. The final period, 1976 to 1978, included articles on oil delivery printing devices, the Code of Ethics of the American Society of Questioned Document Examiners, the free exchange of information, questioned document reexaminations by a second document examiner, and pencil lead.

### **Results**

The findings of the content analysis in regard to topic occurrence in the 106 articles are summarized in Table 5. For the sake of comparison, the figures have been converted to topic occurrence as a percentage of the number of questioned document articles (Table 6). The results are more meaningful if the categories are studied by the sections described above.

The emphasis on the document examiner is most apparent in the 1956 to 1960 period. This could be attributed to the concern shown by established document examiners that the many new people coming into the field should be properly prepared for their profession. However, a renewed emphasis on the value of research appeared in 1976 to 1978.

The emphasis on document examination or the work of the examiner reached a peak

TABLE 5—Topic occurrence per time period.

Topic	1956- 1960	1961- 1965	1966- 1970	1971- 1975	1976- 1978
Document Examiner					
1. Qualifications	5	3	3	5	0
2. Instruction	4	4	3	2	2
3. Court testimony	5	6	1	7	2
4. Court rulings	1	4	0	1	2
5. Value of research	2	4	2	2	5
Document Examination					
6. Handwriting	2	13	10	7	4
7. Hand printing	2	2	3	3	1
8. Typewriter	4	6	4	6	2
9. Ink	3	4	4	4	5
10. Paper	0	1	3	2	4
11. Adhesives	0	0	2	0	1
12. Copy equipment	0	2	1	4	3
Means of Identification					
13. Characteristics	3	3	3	2	2
14. Pressure	2	3	1	1	1
15. Sequence	1	0	0	1	1
16. Exemplars	1	6	4	2	2
17. Classification	0	2	1	2	0
Differences in Writing					
18. Disguise	0	2	2	1	1
19. Deterioration	0	3	2	0	0
20. Geographic areas	0	0	0	2	1
21. Forged documents	1	2	2	4	1
Methods of Identification					
22. Electronics	2	4	3	6	8
23. Infrared and ultraviolet	2	5	2	3	4
24. Chemical analysis	3	1	3	4	4
25. Controlled research	2	4	5	8	7
26. Inferential statistics	0	0	0	0	3
Illustrations					
27. Graphics	6	12	15	19	13
28. Photography	4	7	2	4	1
29. Single cases	1	0	2	3	1
Other					
30. Miscellaneous	5	5	4	5	5
Number of Articles	15	26	18	27	20

in the 1966 to 1970 period although articles in the typewriter category were more prominent in the period 1956 to 1960. Articles in the copy equipment category showed an upward trend from 1956 through 1978.

Articles in the means of identification categories were most numerous in the 1961 to 1965 period, perhaps as a continuation of the concern shown in 1956 through 1960 for proper career preparation.

The emphasis on differences in writing reached a high in 1966 to 1970. This is apparently the next phase of means of identification techniques that peaked in 1961 to 1965. This group of articles showed an interest in additional techniques and information for use in handwriting identification.

The methods of identification section shows an upward trend that reaches its highest emphasis in the 1976 to 1978 period. This is even more significant because 1976 through 1978 represents only three years rather than the five years in the other time periods. Inferential statistics shows a small but sudden appearance in this time span and is pos-

TABLE 6—Topic occurrence as a percentage of number of document articles per time period.

Topic	1956- 1960	1961- 1965	1966- 1970	1971- 1975	1976- 1978
Document Examiner					
1. Qualifications	33.3	11.5	16.7	18.5	0
2. Instruction	26.7	15.4	16.7	7.4	10.0
3. Court testimony	33.3	23.1	5.6	25.9	10.0
4. Court rulings	6.6	15.4	0	3.7	10.0
5. Value of research	13.3	15.4	11.1	7.4	25.0
Document Examination					
6. Handwriting	13.3	50.0	55.6	25.9	20.0
7. Hand printing	13.3	7.7	16.7	11.1	5.0
8. Typewriter	26.7	23.1	22.2	22.2	10.0
9. Ink	20.0	15.4	22.2	14.8	25.0
10. Paper	0	3.8	16.7	7.4	20.0
11. Adhesives	0	0	11.1	0	5.0
12. Copy equipment	0	7.7	5.6	14.8	15.0
Means of Identification					
13. Characteristics	20.0	11.5	16.7	7.4	10.0
14. Pressure	13.3	11.5	5.6	3.7	5.0
15. Sequence	6.6	0	0	3.7	5.0
16. Exemplars	6.6	23.1	22.2	7.4	10.0
17. Classification	0	7.7	5.6	7.4	0
Differences in Writing					
18. Disguise	0	7.7	11.1	3.7	5.0
19. Deterioration	0	11.5	11.1	0	0
20. Geographic areas	0	0	0	7.4	5.0
21. Forged documents	6.6	7.7	11.1	14.8	5.0
Methods of Identification					
22. Electronics	13.3	15.4	16.7	22.2	40.0
23. Infrared and ultraviolet	13.3	19.2	11.1	11.1	20.0
24. Chemical analysis	20.0	3.8	16.7	14.8	20.0
25. Controlled research	13.3	15.4	0	29.6	35.0
26. Inferential statistics	0	0	0	0	15.0
Illustrations					
27. Graphics	40.0	46.2	83.3	70.4	65.0
28. Photography	26.7	26.9	11.1	14.8	5.0
29. Single cases	6.6	0	11.1	11.1	5.0
Other					
30. Miscellaneous	33.3	19.2	22.2	18.5	25.0
Number of Articles	15	26	18	27	20

sibly a forecast of the routine use of techniques accepted long ago in the more established disciplines. All categories in this section seem to be on an upward swing as new equipment and techniques are developed.

Emphasis on illustration was most apparent in 1966 to 1970 when the use of visual aids in articles was at an all-time high. Photography was probably taken for granted during 1976 to 1978 because few articles emphasized it.

Miscellaneous subjects were most prevalent in the first volumes of the *Journal*, 1956 to 1960. Articles in the other time periods display a continued interest in new or different developments.

### Conclusion

There have been two trends in the field of questioned document examinations as observed in the literature over the last 23 years: training for examiners and increased



use of scientific methods and equipment. There has been a continuous drive for properly trained and experienced document examiners, especially in the earlier volumes of the *Journal*. This objective has been achieved partially through the development of the American Board of Forensic Document Examiners' certification program. The implementation of the program and the publicity created in its favor should bring this goal within reach.

The emphasis in scientific methods and equipment noted in the first time period gave way to other interests, only to reappear dramatically in more recent volumes. The present trend is toward more advanced methods and techniques that can be applied in the field of questioned document examination. If the present trend continues, the application of current technology, together with the free exchange of new ideas and progress, will propel the field even further into the arena of modern scientific methodology.

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