Comparative study of Handwriting based on skill level of Hindi and English medium writers

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ABSTRACT

When comparing handwriting of different medium, the method is used to compare the individual and class characteristics. Handwriting is a visible speech which express by writing with the help of writing instrument on the writing surface. However, it is seen that even the most individual characteristics are found to be similar. The present work focuses on investigating this assumption only by collecting the sample from the writers first language is Hindi. Handwriting is generally learned by watching another person write when you are young, but you later develop your own style of writing, which later expresses your personality. The finding of the authors. The objective of the study was to compare the handwriting between the Hindi medium and English medium students. Samples ratio was equally divided i.e. 50 samples from each category were collected and analyzed.

Keywords: Handwriting characteristics; Hindi medium; English medium; author identification.

1. INTRODUCTION

Document is an object or a material that contains symbols, marks or signs visible, partially visible, or invisible, that convey message to someone. Questioned document is the document whose authenticity or source is suspected or questioned; it is also referred as disputed. Albert Osborn in 1910 wrote a book question document in which he mentioned the characteristics of handwriting that can be used for examination. A questioned document is any document that is disputed in the court of law for civil and criminal cases.

Father of handwriting examination, Ordway Hilton in 1956 wrote “scientific examination of questioned document”, in his book he mentions the basic rules of handwriting examination and identification, after 40 years William Harrison in 1996 showcased the recent development in handwriting and question document examination, which can be used to verify a documents writer. Writing is a conscious act, the actual formation of each letter and word is almost automatic, the writer concentrates most of his conscious thoughts on the subject matter rather than on writing process itself. Writing comes to be made of innumerable subconscious and habitual patterns. Handwriting examination is a discriminating process, which derives from the comparison of writing habits, and characteristics in handwriting. Several factors which influence handwriting are- age, illness, physical disturbance, mental disturbance, writing position, writing surface, writing instrument, lightning, alcohol, any disease.

Handwriting identification is analyzed by comparing questioned writing with known writing. While taking handwriting samples the subject is not shown questioned document, not told how to spell words or use punctuation marks and use the materials similar to those of the questioned document, the subject should sign the document after completion.

Handwriting examination involves various steps such as: analysis, comparison and evaluation. Handwriting characteristics are flowing as- line quality, word and letter spacing, letter comparison, pen lifts, connecting strokes, slant and pen pressure.

Individual and Class Characteristics

Individual characteristics are the deviations from the system of writing taught and consequently are strong identifying characteristics, when comparing handwriting samples individual characteristics can be categorized as- the variation from the copy book form, modification in letter formation, tapering form or finish, letter formation, cross strokes or crossbars, loop formation, staff, I dot. Terms generally used to describe individual characteristics- apex, arch, arm, bar, baseline, beard, blind loop, blunt ending, body, bow, connecting strokes, dot, ending strokes, end strokes, loop, margins, midline, pen lift, pen pressure, upper loop etc.
Class characteristics of handwriting are not unique to an individual, but for a group of people. Class characteristics can be classified as—movement, pen pressure, pen presentation, speed, skill, slant, shading, spacing, alignment, rhythm, relative size, proportion of letters. Movement is motion of the writing instrument with the action of hand on the writing surface. Pen pressure is weight or pressure applied to the pen during the act of writing. Pen presentation is the angle of pen with the writing surface or with the line of writing. Speed is the amount of time it takes a write to excite handwriting. Skill is acquired through practice, writer con not exceed his writing skills. Slant/slope is an angle of inclination of writing from the laze line backward, forward, upward. Shading is the changing width of a line, as pen pressure various light, heavy pressure is directly proportional to shading. Spacing is the amount of space between letters, words and line of writing interwork (between) and intra word (within) line quality, good line quality, smooth, and without tremors poor line quality, uneven, shaky, tremors. Alignment is the arrangement of writing on actual or imaginary line ascending, horizontal, descending, uneven.

Normally on the basis of general handwriting characteristics, we cannot give a define opinion, and for giving a definite opinion we have to look for individual characteristics also. The ability to reproduce the letter formations varies from one person to another and is based on a comparative study of handwriting based on skill level of Hindi and English medium writers. Handwriting is mastered through practice and repetition. Once handwriting is mastered, writer focuses on the subject matter rather than the physical act of writing. The writing becomes a pattern of subconscious and habitual formation that is helpful in the comparative study of handwriting based on skill level of Hindi and English medium writers. (Hilton1982, Huber1999). Handwriting features that examiners evaluate include the size and slope of the writing, pen pressure, pen lifts, the spacing between words and letter, the position of the writing on the baseline, beginning and ending strokes, and line quality. The examination is done to find out the authenticity, integrity materials examination handwriting. (Harrison, Burkes and Seiger 2009).

**Sample Preparation**

For a study of handwriting analysis pertaining to different individuals, the handwriting sample from various person should be available. These samples are repeatedly dictated to 50 Hindi medium student and 50 English medium students. Efforts were made to obtain a natural way of writing from the student by following the points stated below.

i. Dictation was given in good speed.
ii. Prior intimation regarding occurrence of the capital letters and the small letters was given and accordingly during the course of the dictation the same was indicated.
iii. Pronunciation was monitored.

2. RELATED WORK

Vikram Kamath et.al. in his study “Development of an automated handwriting analysis system”, talked about behavior of a person was predicted through automated handwriting analysis system. Handwriting were analyzed through image processing in MATLAB. Eight characteristics features of handwriting were obtained to assess the personality of writer, using algorithms and manual analysis. The system developed could be used for the detection of Parkinson’s disease and cancer. It can also be used in document authenticity and lie detection.

Shaista bin-ti-Nazir et.al. in her study “SSGBSAT-A novel approach to perform sentimental analysis using graphology” worked on handwriting samples of 100 people having different thoughts and varying mood. SSGBSAT algorithm was used for the analysis of seven sentiments (contempt, anger, disguise, joy, sad, tear and surprise). The study revealed the rate of trueness of seven sentiments present in a person, while he/she was writing the text. The study could predict the negative behavior of any person, so that counselling could be provided in an early-stage.

G Luria et.al. in her study “A computerized multidimensional measurement of mental workload via handwriting analysis” talked about handwriting behavior which was used to determine mental workload in a person. Three arithmetic progression of different difficulties were written by 56 participants on a digitizer. Differences in temporal, spatial, and angular spacing were observed to determine low and high workload in the person.

Mahesh Ramanina et.al. in his study “Handprints of the mind: Decoding personality traits and handwritings” talked about correlation between clinical diagnosis and graph logical analysis for the purpose of finding the link between personality traits and the manifestations in handwriting among children by using Children’s Personality Questionnaire. The author reported that there were no concrete differences between the psycho diagnostics assessment of personality through Children’s Personality Questionnaire and the handwriting analysis.

Kenshin Ikegami, Yukio Ohswa in their study “Model of Creative Thinking Process on Analysis of Handwriting by Digital Pen” focused on finding the correlation between thinking time and writing time in handwriting of 50
undergraduate participants, by using digital pen (HITACHI maxell, DP-201). The author observed two types of groups
in his experiments, the first one took longer time in thinking and shorter time in writing and the other one took shorter
time in thinking longer time in writing. The group taking longer time in writing showed ‘back-tracking’ which
ultimately resulted in the increased quality of ideas.

Parmeet Kaur Grewal worked on “Behavior prediction through Handwriting analysis”. He used various parameters for
the prediction of behavior of a person, by using computer. The parameters used are letter slant, pen pressure, letter
formation ‘i’ and ‘f’, which were input to the ‘Artificial Neural Network’ which helped in prediction of human
behavior. The tool used for the evaluation of samples was ‘MATLAB’.

P. Mavrogiorougou has worked on “Kinematic analysis of handwriting movements in patients with obsessive-compulsive
disorder”. In his study he studied hand motor performance among 44 participants, in which 22 were patients with
obessive-compulsive disorder (OCD) and 22 health controls. The author detected subtle motor dysfunction in OCD by
using digitizing graphic tablet and observed that the repetitive motor pattern performance among patients with OCD
was better in comparison to the healthy controls.

3. DISCUSSION

The study has been conducted on the handwriting samples of 100 individuals to find out the characteristic features of
handwriting, to determine the difference between handwriting of English and Hindi medium students in Hindi script.
After analyzing handwriting characteristics of Hindi and English medium students it is observe that 24% students of
Hindi medium having Ascending Alignment, 40% students of Hindi medium having Descending Alignment, 36%
students of Hindi medium having Horizontal Alignment and 28% students of English medium having Ascending
Alignment, 28% students of English medium having Descending Alignment, 44% students of English medium having
Horizontal Alignment.

Similarly, 82% students of Hindi medium having Medium Skill, 8% students of Hindimedium having Inferior Skill,
10% students of Hindi medium having High skill and 84% students of English medium having Medium skill, 2%
student of English medium having Inferior Skill, 14% students of English medium having High Skill.

Similarly, 28% students of Hindi medium having Light Pen Pressure, 26% students of Hindi medium having Heavy
Pen Pressure, 46% students of Hindi medium having Medium Pen Pressure and 68% students of English medium
having Light Pen Pressure, 4% students of English medium having Heavy Pen Pressure, 28% students of English
medium having Medium Pen Pressure.

In same manner 40% students of Hindi medium having Smooth Rhythm and 60% students of Hindi medium having
Intermittent Rhythm and 62% students of English medium having Smooth Rhythm, 38% students of English medium
having Intermittent Rhythm.

Similarly, 38% students of Hindi medium having Vertical Slant, 28% students of Hindi medium having Backward slant,
34% students of Hindi medium having Forward Slant and 72% students of English medium having Vertical Slant, 20%
students of English medium having Backward Slant, 8% students of English medium having Forward Slant.
Similarly, the Movement is 100% same in Hindi and English medium writers i.e. Finger + Wrist Movement.

CONCLUSION

The samples of handwriting were examined with regard to the class or general as well as individual characteristics, for
the purpose of comparison of Hindi and English medium students handwriting, written in Hindi script.

The English medium students had more tendencies towards ascending alignment when compared to Hindi medium
students, while the Hindi medium students had more tendencies towards descending alignment in comparison to
English medium students. When compared, the English medium had more tendencies towards horizontal alignment
then the Hindi medium students.

The English medium students had more tendencies towards light pen pressure in comparison to Hindi medium students.
While the Hindi medium students showed more tendencies towards heavy pen pressure as compared to English
medium students. When compared, the Hindi medium students had more tendencies towards medium pen pressure in
comparison to English medium students.

The English medium students showcased more tendencies towards vertical slant as compared to Hindi medium
students. The Hindi medium students had more tendencies towards backward slant in comparison to the English
medium students. When compared, the Hindi medium students had more tendencies towards forward slant then the English medium students.

The English and Hindi medium students had equal tendencies of movement i.e. they both write in finger+wrist movement.

The English medium students had more tendencies towards medium skill when compared to Hindi medium students. While, the students of Hindi medium showed more tendencies towards inferior skill as compared to English medium students. When compared, the English medium students had more tendencies towards high skill in comparison to Hindi medium students.

The English medium students showed more tendencies towards smooth rhythm as compared to Hindi medium students. While in comparison Hindi medium students had more tendencies towards intermittent rhythm in comparison to English medium students.

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