

Grapheme-based Method of Handwriting Dating and its Use in Archival Studies

Abstract: Handwriting style has long been used by foreign textual scholars for dating purposes. Theodora Ward gives distinctive features of every year of Emily Dickenson's handwritings. Madeline House has corrected Charles Dickens' own misdatings. Gustave Flaubert's undated manuscripts have recently been dated with an accuracy of about 62%. As for the similar practices of grapheme-based dating in Georgia, there is not much to speak about. For the beginning, it is important to try this method for the study of at least one Georgian author's archival documents and if consistent results are achieved it will be a good basis for further investigations.

Key Words: graphology, Georgian studies, archival studies, textual studies, grapheme-based method.

The development of Digital Technologies has brought great challenges to Textual scholarship and Archival Studies, and Georgian scientists need to do their best to update their methods and introduce new approaches (Ninidze... 2018: 205-206). In this article, we are going to discuss how the dated archival documents can be used for dating the undated ones.

On the one hand, everyone's handwriting is different and unique, while on the other hand, it develops in course of time. As a result, handwriting analysis is used for different purposes and in different aspects. It should be noted that in the first stage when we master a skill of writing, our manuscripts have very few peculiarities but in the course of time, our handwriting begins to deviate from copy-book forms and develops individual features. Some people even deliberately work on their handwriting style (for example, a Georgian writer, Guram Rcheulishvili). Individual characteristics of a person's handwriting can be seen just in these deviations from copybook standards but a great number of manuscripts should be studied to identify these deviations.

Textual scholars creating transcripts of manuscripts or working on scholarly editions, need to be familiar with particular authors' handwritings. For this purpose, the Association for Textual and Editorial Studies and Digital Humanities has introduced a new approach. They suggest studying graphetic variations of Georgian classic authors' handwritings and creating charts, visualizing forms of graphemes specific for particular authors' handwritings (typical charts) and the forms of graphemes, not specific for their handwriting in general, but appearing as accidental (a one-time thing) somewhere in their manuscripts (atypical charts). These models have enabled us to read a great number of messy and blurred manuscripts and make transcripts for various scholarly editions (Tvalavadze 2019: 41-43). Typical charts, representing features that are deviated from standards but are frequent in particular authors' handwritings, are very helpful for handwriting identification which is one of the most important tasks in archival and textual studies.

In the personal archives of writers, most of the documents are holographs of particular authors (A manuscript in its author's handwriting) but some different cases may take place as well: texts – composed by them and written in somebody else's hand; Texts composed by somebody else and written in the particular writer's hand or even somebody else's holographs. There are also cases in which texts are copied by somebody else and only corrections and completions are made in the author's own hand or the ones in which different parts of the text are written in different hands. If we do not differentiate such documents, we can make mistakes in their attribution. Georgian writer Alexander Kazbegi used to collect folklore and, a number of folk poems in his archive are kept in his handwriting. As a result, in the first editions of the writer's works, many of these texts have been published as his own. In Ilia Chavchavadze's personal archives, there are other people's holographs even in such private and intimate substrates as notepads. Such cases should always be identified and

specified in archival descriptions. That's why it is so important to know specific features of particular authors' handwritings.

Handwriting analysis is used not only in textual and archival studies but in forensic investigations as well. It is used for detecting forgery or is studied as evidence material (Stewart 2017: 139-141). As for Textual Scholars, the handwriting style has long been used by them to assign undated manuscripts to their historical period but the dating of the texts within a year or less is a bit more complicated and is a relatively recent development. In the first volume of Emily Dickenson's poems, Theodora Ward gives distinctive features of every year of the author's handwritings (Ward 1955: XLIX-LIX.). Madeline House used calligraphy for dating Charles Dickens' letters and this method enabled her even to correct Dickens' own misdatings that were quite frequent in his manuscripts, especially at the beginning of a new year. (House 1965: XXIV-XXV; House 1969: XIII).

Nowadays, the same principles and modern technologies enable scholars to work on greater amounts of texts and achieve impressive results. In the research, dedicated to feature-extraction methods for manuscript dating, authors describe how to use an automatic system based on modern pattern recognition techniques and how to extract the handwriting patterns from the images into the feature vectors, representing the handwriting style. In order to extract the handwriting styles, several dedicated feature-extraction techniques have been explored. Some people consider that dating the manuscripts on the basis of handwriting analysis is not reliable but they don't consider that before the computer era creative people regularly wrote by hand and their handwriting was constantly changing. Modelling of all those changes appearing in course of time in their personal handwritings made it possible to generate unique sets of algorithms for different periods and enabled scholars to date some manuscripts even with a high degree of confidence.

As for the similar practices of grapheme-based dating in Georgia, there is not much to speak about. In scholarly editions of various Georgian writers, one can find some texts attributed to the particular periods of their life "according to handwriting" but none of the editors speaks of the features that have been considered for making such conclusions. Maybe some experienced scientists have made the right decisions but still, we consider that there should be more specified reasons for such conclusions than just flair. On the basis of references to specific historical or biographical events used in the texts, we have recently dated hundreds of personal letters, poems, fiction, etc. We may say that we use this method of dating with excellent results, but sometimes texts are very short or there are no such clues – facts associated with definite dates. The only thing to help us in dating such works is the graphological analysis in which we have very poor practice.

There are hundreds of manuscripts of different writers in the repositories of Giorgi Leonidze Museum of Georgian Literature. Half of them is dated and the other half is not. If we group the dated manuscripts, according to the years, study them and make grapheme charts, we may create a script-style evolution map with models for each year and may use them for dating of the rest of the manuscripts of the same author. As far as we have not carried out similar investigations in Georgia up to now, we will try to take into consideration some conclusions from the experience of our foreign colleagues.

In the first stage of the grapheme-based dating studies, when we compare handwritings of different years of the particular author aimed at the identification of distinguishing features (inductive reasoning), we should concentrate mainly on differences while in the second stage, when we compare features of the query document with the ones peculiar to each year (deduction), greater interest should be paid to similarities.

When we say that handwriting of people changes in course of time, we mean not only forms of graphemes but some other features as well, such as: Where do letters start and how is each one formed? Are they written in a clockwise fashion or counter-clockwise? Organization of the page and exploitation of the available space, the spacing between graphemes, words and lines, margins, proportions of the grapheme parts, ligatures (letter combinations), links, ties, slant, deviation from the baseline, the relation between height and width of letters, paper, and ink specifications. It is also important whether the writing is above the baseline (the baseline can be imaginary as well) or below it. Does the writer use abbreviations or shortcuts or none?

Certain aspects should be taken into consideration while choosing dated documents for working out the features of the criteria. Comparison of homogeneous manuscripts has more reliable results. Therefore, it is important to obtain data from all kinds of documents and to group them. Precision in dating depends on the amount of the dated material analysed for the research and the number of variants for each grapheme.

It is important to group manuscripts not only according to years, but according to their types (fair copy or first draft, neat or messy manuscript, legible, or illegible) and writing instruments (pencil or ink). Besides, the letters should be grouped according to their place in the word (initial, medial, terminal) as they are often written differently in these positions. Sometimes letters vary in a random way. Therefore, it is important to discover the right clues for dating. After the analysis of the dated texts, we may have distinctive features of the writer's handwritings for each year. Some features may be similar for different years but, of course, not all of them and it will help us to identify the date.

In order to describe the results of the grapheme-based analysis, we will need to introduce some new graphological terms (alongside the main parts of the graphemes: body, back, head, foot) in order to identify the smallest elements of letters like it is in English: shaft, cross-bar, bowl, arms, cross-strokes, hook, etc., We will need a special term for a connecting stroke in a ligature (link) and a stroke connecting distinct parts of a single letter (tie).

In order to test the relevance of the dating models developed by us for different years, we may use a blind analysis of dated texts from each year and check the results. I mean dating the texts or their parts not knowing their original dates. If the dating features are relevant, the years identified by us as a result of their analysis will match those indicated in the originals. If the results do not match, it will mean that the work on feature identification should be continued until it enables us to get adequate results.

For the beginning, it is important to try this method for the study of at least one Georgian author's archival documents and if consistent results are achieved it will be a good basis for further investigations. Not only Giorgi Leonidze Museum of Georgian Literature but all the repositories of Georgian written culture are full of manuscripts that, being undated, are pulled out of their biographical and historical contexts and need to be dated to acquire their original place.

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