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Digital Reactions, Discourse and Sentiment on Educational Reform: A Text Mining Study of the Türkiye Century Maarif Model on X

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Article history	The Türkiye Century Maarif Model, introduced by the Ministry of National Education in 2024, represents a major curriculum reform. Although previous research has examined teachers, administrators, and teacher candidates mainly through surveys and interviews, spontaneous digital reactions remain underexplored. This study investigates discourse surrounding the Maarif Model on X. Posts containing five reform-related hashtags were collected through the X API and analyzed in Python using a KDD-informed text-mining framework. The analysis combined BERT-based sentiment classification, word-frequency analysis, and Latent Dirichlet Allocation topic modelling. Data preparation included duplicate removal, relevance screening, and bot/noise filtering, while automated sentiment labels were interpreted cautiously because no independently coded gold-standard validation set was available. Positive posts constituted the largest sentiment category across all hashtag-based subsets, suggesting substantial symbolic support for the reform. However, negatively oriented posts contained more prominent references to projects, targets, administrative expectations, and implementation-related concerns. Topic patterns also linked the reform discourse to curriculum, teacher roles, student-centered approaches, institutional coordination, and local implementation. Broader hashtags were associated with relatively
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more critical or contested expressions, whereas institutionally aligned hashtags contained stronger positive discourse. These findings suggest that social media can provide an early source of feedback on large-scale educational reforms, although it should not be treated as representative public opinion. The study illustrates how computational analysis of digital discourse can complement traditional policy-evaluation methods.

Introduction

Curriculum reform is one of the most visible ways a society defines what it seeks to value, preserve, and transform through education. It shapes not only what students learn but also how schools translate social, cultural, and national priorities into everyday practice. Curriculum reform should therefore be seen not as a finished product but as an evolving process. As Fitzpatrick et al. (2023) note, reform processes can be viewed as a continuing chain of action that can function either as an engine of progress or as a safeguard against failure. From this perspective, each major reform cycle requires sustained attention and reflects changing social needs and expectations.

The Türkiye Century Maarif Model (Türkiye Yüzyılı Maarif Modeli), introduced by the Ministry of National Education (MoNE) [Millî Eğitim Bakanlığı (MEB)] in April 2024 and approved in May 2024, is a broad curriculum reform that began phased implementation on September 9, 2024, in preschool, 1st, 5th, and 9th grades. Its central direction can be summarized as an attempt to connect curriculum renewal, skills-based learning, and values education under the ideal of the “Competent and Virtuous Person” (Yetkin ve Erdemli İnsan). The model also includes the “Virtue-Value-Action” (Erdem-Değer-Eylem) framework, which links values and virtues to observable actions while combining national, spiritual, and universal educational priorities (Millî Eğitim Bakanlığı [Ministry of National Education], 2024).

The reform has generated a growing body of academic research, most of which documents early reactions among actors within the school system. Recent studies have analyzed the perspectives of teachers (Duyul et al., 2025; Seyyar & Aydın, 2025; Uludağ Kırçıl & Uluçınar Sağır, 2025; Uygun & Akgül, 2024), school administrators (Küçük & Kurt, 2025), and teacher candidates (Karataş, 2025; Özkara, 2026). These perspectives are essential because these stakeholders are the primary actors who translate reform policy into practice. However, most existing studies rely on surveys or interviews, where responses may be shaped by structured research settings and perceived expectations. Such contexts may increase the likelihood of social desirability bias, leading individuals to present opinions that align with institutional or social norms rather than their genuine views (Ocen, 2025; Podsakoff et al., 2003).

By contrast, social media offers a more spontaneous space for reactions to education reform. On platforms such as X, teachers, administrators, and other stakeholders openly discuss policy changes, implementation challenges, and institutional expectations. Policy feedback theory helps explain why this discourse takes the form it does: policies shape not only institutional outcomes but also how people interpret, evaluate, and respond to them (Mettler & SoRelle, 2018; Pierson, 1993). In education, implementation similarly depends on how local actors make sense of policy demands in practice (Spillane et al., 2002). When this sensemaking becomes publicly visible—as it does on platforms like X—social media discussions function not merely as reactions to reform but as a visible feedback space where stakeholders publicly interpret, endorse, question, and renegotiate policy change.

The growth of the web has transformed public interaction with information from passive consumption to active content production (Kaplan & Haenlein, 2010). Social media platforms now provide spaces where stakeholders share opinions in real time and where issue-specific publics form around topics and hashtags (Bruns & Burgess, 2015). Yet these platforms should not be treated as neutral mirrors of public opinion; rather, they reveal how sentiment, visibility, and public expression interact in digital communication (Papacharissi, 2014). For education policy research, such data offers a way to observe how reforms are publicly circulated, supported, questioned, and debated.

In this study, X was selected because of both its reach and its role in Turkish public debate. In early 2024, X's advertising data indicated 20.67 million users in Türkiye, corresponding to 24.0% of the total population and 27.8% of the local internet user base, although these figures should not be interpreted as direct monthly active user counts (Kemp, 2024). In Türkiye, X is widely used by public institutions, journalists, educators, unions, school administrators, and politically engaged citizens to circulate announcements, react to policy decisions, and participate in hashtag-based debates. It therefore provides a relevant setting for examining the circulation of the Maarif Model, provided the findings are interpreted as digitally expressed stakeholder discourse rather than representative national opinion.

To analyze this large body of unstructured text, the study combines sentiment analysis and topic modelling. Sentiment analysis uses computational techniques to identify the emotional orientation of text, commonly distinguishing positive, negative, and neutral categories (Binali et al., 2009; Pang & Lee, 2008; Singh et al., 2013). It has become increasingly useful for examining current issues in education and social-media-based educational discourse (Mujahid et al., 2021; Toçoğlu & Onan, 2021; Tubishat et al., 2023). In the present study, a BERT-based sentiment model was preferred because transformer-based models capture contextual meaning more effectively than traditional feature-based classifiers (Devlin et al., 2019; Gardazi et al., 2025; Minaee et al., 2021), an advantage that becomes especially important for short and ambiguous social media posts (Catelli et al., 2022).

Based on this rationale, the study addresses the following research questions:

- (1) What is the emotional distribution of X posts in relation to the Maarif Model?
- (2) What are the most frequent terms and concepts within positive, negative, and neutral X posts?
- (3) What are the primary latent themes that characterize X discourse on the Maarif Model?
- (4) How do the selected hashtags differ in emotional tone and thematic focus?

Methodology

Research Design

This study employed a mixed computational approach to text-analysis. Quantitatively, it examines sentiment distributions, word frequencies, hashtag-level differences, and weekly posting activity. Qualitative interpretation focused on latent topics and word clusters in relation to policy feedback and reform implementation. The workflow followed the logic of Knowledge Discovery in Databases (KDD), an iterative process of selection, preprocessing, transformation, data mining, and interpretation (Fayyad et al., 1996). The KDD-informed process involved five steps: (1) selecting Maarif Model-related hashtags, (2) collecting and



preprocessing posts through the X API, (3) cleaning, filtering, and transforming the data, (4) applying BERT-based sentiment analysis, word-frequency analysis, and LDA topic modelling, and (5) interpreting the results in relation to the research questions and policy context.

Dataset

To examine how the Maarif Model was received on social media, data were collected from X via its API starting on April 25, 2024, when the reform began to receive increased public attention. The dataset was constructed using five Turkish hashtags selected based on official communications surrounding the reform and recurring patterns observed in discussions among the Ministry of National Education (MoNE), local education authorities, and the broader education community: #maarifmodeli, #TürkiyeYüzyılınınMaarifModeli, #KöklerdenGeleceğe, #GelecekÇokGüzelGelecek, and #TürkiyeYüzyılıMaarifModeli. For readability and consistency, these Turkish hashtags are reported throughout the manuscript using English-equivalent labels: #MaarifModel, #MaarifModeloftheCenturyofTürkiye, #FromRootstotheFuture, #TheFutureWillBeVeryBeautiful, and #TürkiyeCenturyMaarifModel. These hashtags encompassed both direct references to the reform and slogan-based dissemination discourse, since a single-keyword strategy would not adequately reflect how the Maarif Model circulated on X. This multi-hashtag approach yielded a sufficiently broad dataset while maintaining a clear analytical focus.

Table 1. Number of X posts by hashtag

Hashtag	Raw Post Count	Net Post Count
#MaarifModel	10,431	1,163
#MaarifModeloftheCenturyofTürkiye	6,353	1,013
#FromRootstotheFuture	9,689	1,350
#TheFutureWillBeVeryBeautiful	3,411	178
#TürkiyeCenturyMaarifModel	7,528	519

Table 1 reports the number of X posts retrieved for each hashtag before and after cleaning. Raw post counts refer to all API-retrieved posts, whereas net post counts indicate the posts retained after excluding duplicates, reposts, media-only content, empty posts, and irrelevant texts. #MaarifModel and #FromRootstotheFuture generated the largest usable datasets, while #TheFutureWillBeVeryBeautiful remained comparatively limited.

Data Cleaning, Bot Screening, and Noise Reduction

Because social media data may include duplicates, coordinated posting activity, media-only content, and automated accounts, the dataset was cleaned before analysis. Duplicate posts, reposts, empty posts, media-only posts, and texts unrelated to the Maarif Model were removed. Posts were also screened for likely automated activity and other sources of noise using rule-based indicators, including unusually high posting frequency, repeated wording, excessive hashtag stacking, URL-only content, and near-duplicate text across accounts. These procedures cannot fully eliminate concerns related to bot-detection, since automated accounts may imitate human behavior and bot detection remains probabilistic (Orabi et al., 2020; Ruths & Pfeffer, 2014). Therefore, bot screening is treated as a risk-reduction strategy rather than a guarantee that all automated activity has been removed.

Text Mining

This study adopted a text-mining approach to examine discourse surrounding the Maarif Model. Text mining involves preprocessing and modelling large-scale textual data to identify meaningful patterns and relationships (Vijayarani et al., 2015). Within the KDD-informed workflow, preprocessing included text normalization, duplicate control, removal of irrelevant or media-only posts, token preparation, and converting cleaned posts into formats suitable for analysis. This approach also follows the broader “text as data” perspective in computational social science, where naturally occurring text is used to identify patterns that may be difficult to detect manually, provided that researchers remain attentive to validity, sampling, and interpretive limits (Grimmer et al., 2022). All preprocessing, sentiment classification, and topic modelling procedures were implemented in Python.

A BERT-based model was selected because social media texts are often brief, context-dependent, and vulnerable to irony, polysemy, and implicit evaluation. Unlike approaches that treat words mainly as isolated features, BERT uses bidirectional contextual representations, allowing the model to interpret words in relation to surrounding expressions (Acheampong et al., 2021; Devlin et al., 2019). This makes it more suitable than many traditional feature-based classifiers for short and contextually dense posts. Nevertheless, BERT-based outputs are interpreted as model-assisted classifications rather than error-free results, and their reliability depends on transparent preprocessing and, where possible, manual validation.

Sentiment Analysis

Sentiment analysis was used to identify positive, negative, and neutral orientations in X posts about the Maarif Model. As an NLP technique, it captures not only textual content but also the writer’s emotional orientation (Nandwani & Verma, 2021), making it useful for examining short social media posts that may reflect public opinion and broader social tendencies, though not in a fully representative way (Mellon & Prosser, 2017). Because traditional lexicon-based or feature-based approaches often struggle with brevity, ambiguity, irony, negation, polysemy, and context dependence in social media language, a BERT-based model was preferred (Catelli et al., 2022). After preprocessing, posts were transformed into BERT embeddings, and a classifier estimated the probabilities associated with positive, negative, and neutral labels; the label with the highest probability was recorded as the final sentiment category. This procedure enabled thousands of X posts to be processed in a context-sensitive manner, supporting sentiment classification based on semantic context rather than isolated word occurrences alone (Ishtiaq et al., 2024).

Topic Modelling

Topic modelling was used to identify the main themes and patterns of discussion surrounding the Maarif Model on social media. As a text-mining technique, it enables the discovery of latent patterns and themes within large document sets (Chauhan & Shah, 2021), making it suitable for clustering similar posts and identifying broader trends without manual case-by-case analysis.

The study used Latent Dirichlet Allocation (LDA), a probabilistic topic-modelling algorithm based on the assumption that each document, here an individual post, may contain multiple topics in different proportions (Blei et al., 2003; Zhou et al., 2017). Accordingly, a post is not restricted to a single category; instead, it contributes to multiple topics to varying degrees, while each topic is represented by a distribution of words, thereby revealing thematic relationships among documents and terms (Trivedi et al., 2023). LDA was preferred because



the study was exploratory: the aim was not to assign posts to predefined categories, but to identify latent thematic structures emerging from the hashtag discourse itself. A supervised topic-classification model would have required a labelled training set and predefined topic categories, which were not available and would have limited the detection of unexpected themes.

LDA analyzes word co-occurrences within posts to estimate the probability of terms appearing together (Lee & Ostwald, 2024). For example, frequent co-occurrence of words such as “teacher,” “school,” and “student” may indicate a shared theme. The algorithm distributes each post across a set number of topics based on probability and identifies the words that characterize each topic. In this study, LDA revealed thematic areas such as curriculum, teacher roles, student-centeredness, projects, and slogan-based dissemination language. In addition, the model allowed direct examination of dominant topic words, supporting the interpretive process (Topaloğlu & Polat, 2025). Integrated with sentiment analysis and word-frequency data, LDA enabled assessment of the Maarif Model discourse at both emotional and thematic levels.

Findings

The findings are organized around the four research questions. RQ1 presents the distribution of sentiment across posts associated with the five hashtags; RQ2 examines the most frequent terms in positive, negative, and neutral posts; RQ3 reports the latent topic patterns generated by the LDA analysis; and RQ4 compares differences in sentiment and thematic emphasis across the hashtag-based subsets.

Overall, the data indicate variation in both the volume and character of social media responses to the Maarif Model. Positive posts constitute the largest category across all five hashtag-based subsets, although negatively oriented posts are also visible, particularly in discourse containing implementation-related terms. The word-frequency analysis highlights recurring references to school, teacher, and student, whereas the LDA results suggest that the discourse is organized around curriculum, teacher roles, student-centered approaches, and project-related activities. Table 2 presents the distribution of sentiment across the five hashtag-based subsets.

Table 2. Sentiment distribution by hashtag

Hashtag	Positive	Negative	Neutral
#MaarifModel	891	207	65
#MaarifModeloftheCenturyofTürkiye	906	100	7
#FromRootstotheFuture	1,120	215	15
#TheFutureWillBeVeryBeautiful	172	4	2
#TürkiyeCenturyMaarifModel	440	72	7

Table 2 presents the distribution of positive, negative, and neutral posts across the five hashtag-based subsets. In terms of raw counts, positive posts constitute the largest category in each subset. The highest number of positive posts is observed among posts associated with #FromRootstotheFuture, followed by #MaarifModeloftheCenturyofTürkiye and #MaarifModel. The largest numbers of negative posts are also found in the #FromRootstotheFuture and #MaarifModel subsets. However, because the total number of posts varies across the subsets, these raw counts should be interpreted together with their proportional distributions. Posts associated with #TheFutureWillBeVeryBeautiful constitute the smallest subset and include relatively few negative and neutral posts. Figure 1 presents the

sentiment distributions as percentages.

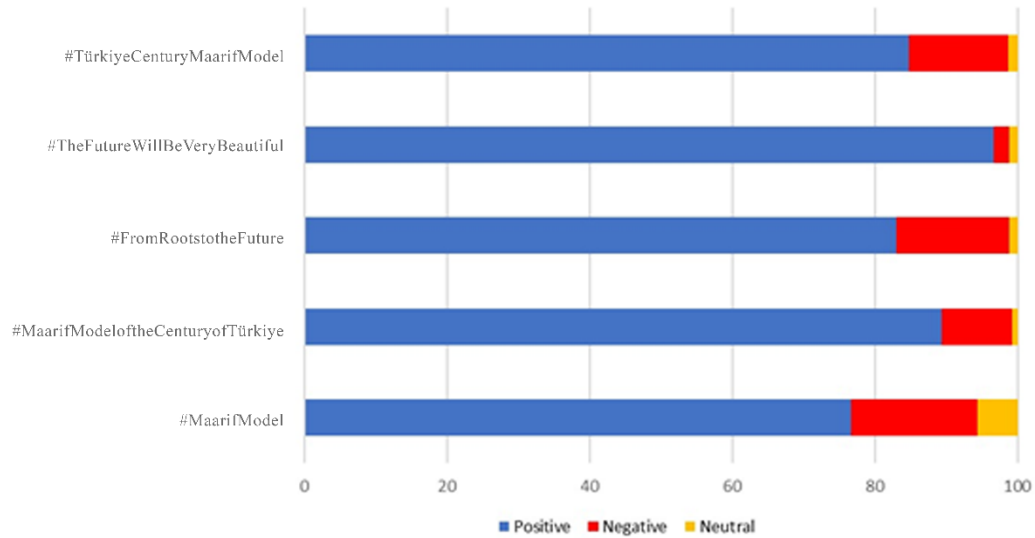


Figure 1. Percentage distribution of sentiment by hashtag

Figure 1 presents the proportional distribution of sentiment across the five hashtag-based subsets. Positive posts account for the largest share in each subset, suggesting that the discourse captured in the dataset is predominantly favorable toward the Maarif Model. Posts associated with #TheFutureWillBeVeryBeautiful have the highest positive proportion; however, this pattern should be interpreted cautiously because this subset contains substantially fewer posts than the others. High positive proportions are also observed in the #MaarifModeloftheCenturyofTürkiye and #TürkiyeCenturyMaarifModel subsets. In comparison, the proportions of negative posts are highest among posts associated with #MaarifModel and #FromRootstotheFuture, followed by #TürkiyeCenturyMaarifModel. This pattern may indicate that critical or contested expressions are relatively more visible within these broader reform-related subsets. Figure 2 extends the analysis by presenting changes in posting activity over time.

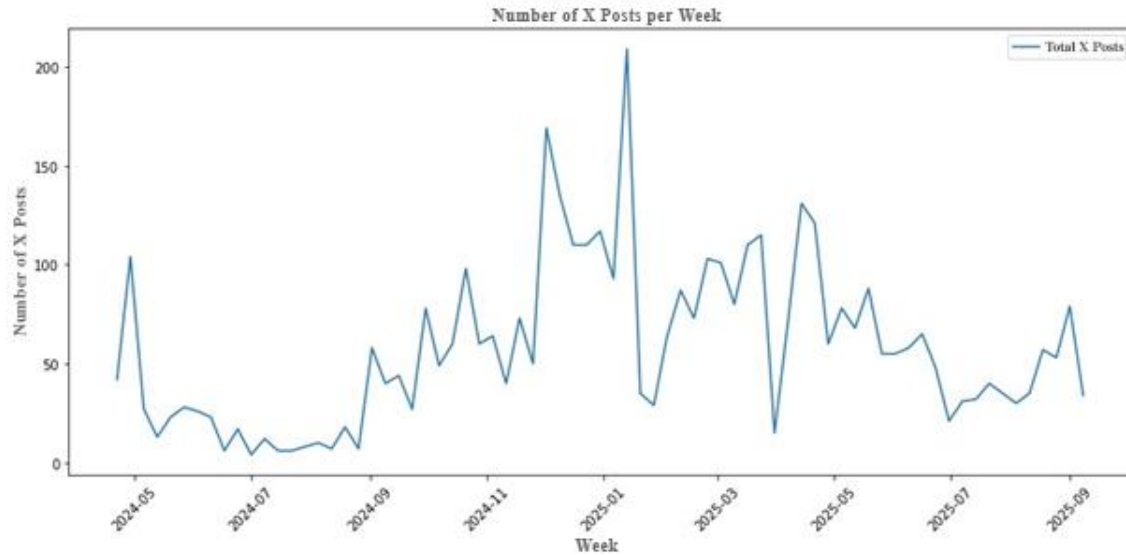


Figure 2. Weekly variation in total number of X posts

Weekly posting activity concerning the Maarif Model from March 2024 onward is presented in Figure 2. The number of posts increased notably in May 2024, declined during the summer months, and rose again from September 2024, coinciding with the beginning of the academic year. A marked peak is observed in early January 2025. Rather than being attributable to a single event, this increase may reflect the temporal convergence of field-level activities and official communication. During this period, official local education pages reported Türkiye Century Maarif Model-related eTwinning workshops and training activities, while other MoNE units publicized evaluation and coordination meetings (Artvin İl Millî Eğitim Müdürlüğü [Artvin Provincial Directorate of National Education], 2025; Konya İl Millî Eğitim Müdürlüğü AR-GE [Konya Provincial Directorate of National Education R&D Unit], 2025; Talim ve Terbiye Kurulu Başkanlığı [Board of Education], 2025). After February 2025, posting activity continued to fluctuate, with increases in March and April, a decline in May, lower levels during the summer, and a partial recovery in August and September 2025. These temporal fluctuations appear to coincide with the academic calendar, local implementation activities, and periods of public communication concerning the reform. Table 3 presents the most frequent words in positive, negative, and neutral posts, providing a closer view of the lexical patterns associated with the sentiment categories.

Table 3. Word frequency list by hashtag and sentiment

Hashtag	Positive	Negative	Neutral
#MaarifModel	education	education	educationmodel
	MoNE	students	turkeycentury
	school	project	MoNE
	students	target	school
	teachers	national	curriculum
#MaarifModeloftheCenturyofTürkiye	school	school	school
	education	model	director
	national	education	students
	primary	scope	teachers
	director	students	education

#FromRootstotheFuture	school education MoNE director students	school secondary national students century	education MoNE director school century
#TheFutureWillBeVeryBeautiful	school director students teachers met	school provincial director workshop project	director students model education information
#TürkiyeCenturyMaarifModel	MoNE education school students teachers	school director established students national	education MoNE national school teachers

Table 3 presents the most frequently occurring words in positive, negative, and neutral posts within each hashtag-based subset. Across the subsets, terms such as “school,” “education,” “students,” and “teachers” recur prominently, pointing to a shared lexical focus on schools and the principal actors involved in education. In positively classified posts, these terms frequently co-occur with institutional and activity-related words such as “MoNE,” “national,” “primary,” “project,” and “director.” This pattern suggests that positively oriented discourse is often associated with official communication, school-based activities, and references to students and educational reform.

A different lexical pattern appears in negatively classified posts. Terms such as “project,” “target,” “scope,” “workshop,” “provincial,” “director,” and “national” occur prominently, suggesting that negatively oriented discourse may be associated with implementation processes, administrative expectations, local activities, and the perceived scope of the model. However, these word frequencies alone do not establish whether criticism is directed primarily at implementation rather than at the reform itself. These terms are particularly visible in the #MaarifModel and #FromRootstotheFuture subsets, which also contain comparatively higher numbers and proportions of negative posts. In neutral posts, institutional and descriptive terms such as “MoNE,” “director,” “curriculum,” “education,” “model,” and “information” are prominent, pointing to a predominantly informational or descriptive style of communication.

Taken together, the lexical distributions presented in Table 3 suggest that the sentiment categories differ not only in polarity but also in the terms most frequently associated with them. Positively classified posts are more frequently characterized by references to schools, students, teachers, and institutional reform, whereas negatively classified posts contain more prominent references to projects, targets, scope, and administrative implementation. These patterns point to a recurring focus on school-level actors while also drawing attention to implementation-related concerns in negatively oriented posts. A more detailed visual comparison of the lexical patterns in posts associated with #MaarifModel is provided in Figure 3.

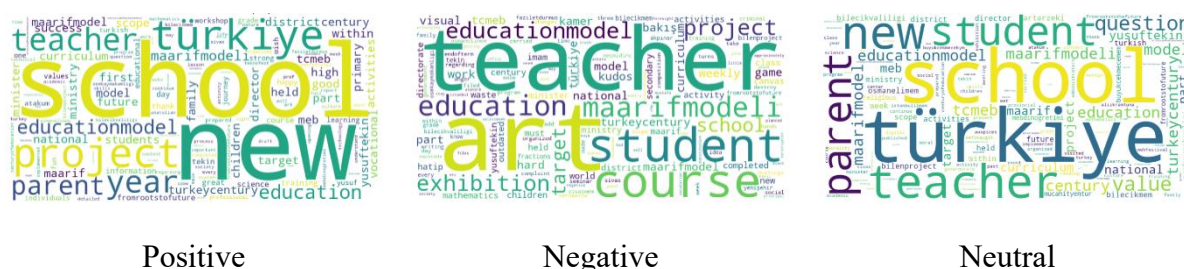


Figure 3. Word clouds for the hashtag #MaarifModel

The word clouds in Figure 3 provide a visual summary of the terms associated with positive, negative, and neutral posts containing #MaarifModel. In positively classified posts, words such as “school,” “new,” “teacher,” and “project” are prominent. Their co-occurrence may reflect favorable attention to school-based initiatives and teacher-related developments. References to “parent” and “educational activities” may also suggest an emphasis on participation within the school community. In negatively classified posts, “teacher” appears prominently alongside terms such as “art,” “exhibition,” “course,” “student,” “project,” and “target.” These lexical associations may point to concerns related to implementation, project objectives, or activity-related expectations; however, the word cloud alone does not establish the specific object of criticism. The neutral category includes visible references to “school,” “Türkiye,” “teacher,” “new,” “student,” “curriculum,” “value,” and “question,” which appear consistent with more descriptive or informational communication. Across the three sentiment categories, school-level actors remain prominent, while the surrounding vocabulary differs according to sentiment orientation. Figure 4 provides the corresponding comparison for posts associated with #MaarifModeloftheCenturyofTürkiye.

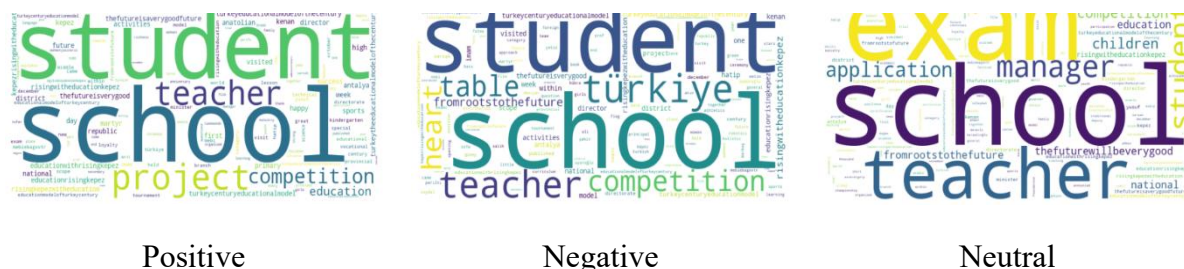


Figure 4. Word clouds for the hashtag #MaarifModeloftheCenturyofTürkiye

The comparison presented in Figure 4 highlights the terms occurring in positive, negative, and neutral posts associated with #MaarifModeloftheCenturyofTürkiye. In positively classified posts, “student,” “school,” and “teacher” are particularly prominent, followed by “project,” “competition,” and “fromrootstothe future.” This pattern suggests that favorable posts frequently refer to school actors and activity-based initiatives such as projects and competitions. In negatively classified posts, “school” and “Türkiye” appear alongside “student,” “teacher,” “competition,” “table,” and “heart.” These co-occurrences may point to concerns expressed in connection with schools, competitions, or broader reform-related communication; however, the word cloud alone does not identify the specific focus or meaning of the criticism. In the neutral category, the prominence of “teacher,” “school,” “manager,” “student,” “application,” and “children” appears consistent with formal, administrative, or informational content. The recurring presence of school-related actors across all three categories suggests substantial lexical continuity, while differences in

sentiment appear to be associated with the surrounding vocabulary. Figure 5 presents the corresponding word-cloud patterns for posts associated with #FromRootstotheFuture.

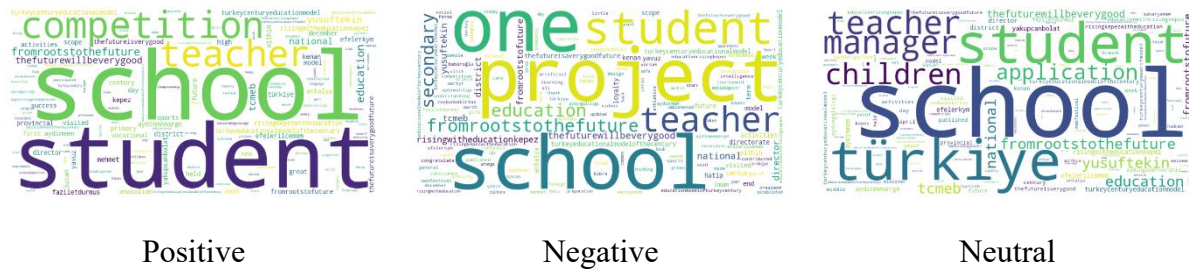


Figure 5. Word clouds for the hashtag #FromRootstotheFuture

As shown in Figure 5, the word clouds for posts associated with #FromRootstotheFuture reveal both recurring and sentiment-specific lexical patterns. In positively classified posts, “student,” “school,” and “competition” are among the most prominent terms. Their co-occurrence with references to teachers, achievement, and future-oriented activities suggests that favorable discourse frequently centers on students, schools, and organized educational activities. In negatively classified posts, “project” and “competition” appear prominently alongside “Türkiye,” “student,” “teacher,” and “school.” This pattern may reflect concerns associated with projects, competitions, or their implementation, although the word cloud does not establish the precise object or nature of the criticism. Neutral posts contain prominent references to “Türkiye,” “school,” “student,” and “teacher,” together with “manager,” “application,” and “children,” appearing consistent with administrative or informational communication. The shared prominence of students and schools across the three categories points to a common educational focus, while project- and competition-related terms are more visible in the negatively oriented posts. Figure 6 turns to the lexical patterns associated with #TheFutureWillBeVeryBeautiful.

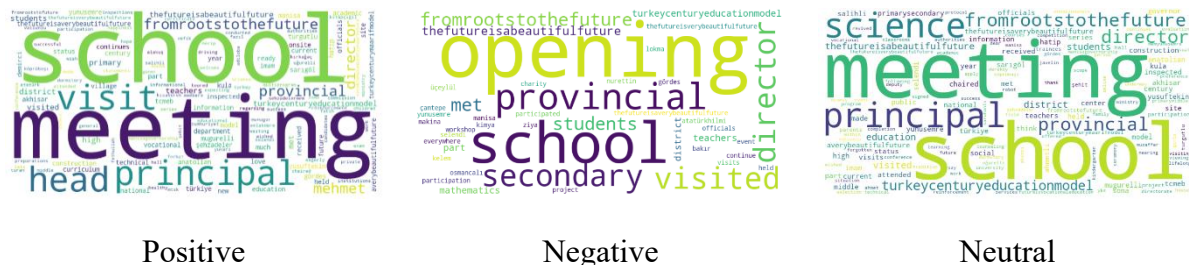


Figure 6. Word clouds for the hashtag #TheFutureWillBeVeryBeautiful

Figure 6 draws attention to the lexical patterns found in positive, negative, and neutral posts associated with #TheFutureWillBeVeryBeautiful. In positively classified posts, “school” and “meeting” are particularly prominent, together with “visit,” “principal,” and “head.” These co-occurring terms suggest that favorable posts frequently refer to school visits, meetings, and the participation of educational administrators. In negatively classified posts, “opening,” “director,” “provincial,” and “school” appear alongside “students,” “secondary,” “workshop,” and “visited.” This pattern may indicate concerns associated with official events, administrative practices, or school-level activities, although the word cloud does not reveal the specific nature of these concerns. Neutral posts prominently feature “school,” “meeting,” “principal,” “science,” “students,” “director,” and “provincial,” which appears consistent with formal and descriptive communication about educational activities. Across the three

categories, administrative and school-related vocabulary remains highly visible, with sentiment differences appearing mainly in the surrounding activity-related terms. Figure 7 provides the final word-cloud comparison for posts associated with #TürkiyeCenturyMaarifModel.

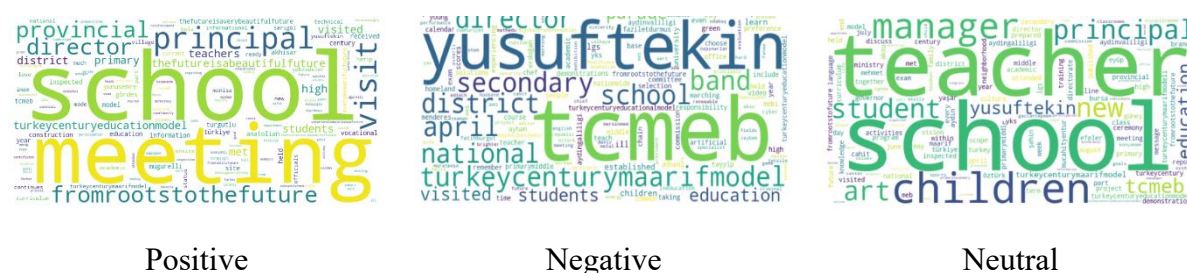


Figure 7. Word clouds for the hashtag #TürkiyeCenturyMaarifModel

The final word-cloud comparison, presented in Figure 7, summarizes the lexical patterns in positive, negative, and neutral posts associated with #TürkiyeCenturyMaarifModel. In positively classified posts, “principal,” “school,” “teacher,” and “Türkiye” are particularly prominent, together with “classroom” and “education.” These co-occurrences suggest that favorable posts frequently refer to school leadership, teachers, and classroom-based educational practices. In negatively classified posts, “project,” “Yusuf Tekin,” “MoNE,” and “school” appear alongside “secondary,” “district,” “band,” and “parade.” The prominence of these terms may reflect concerns expressed in relation to projects, public officials, institutional actors, or specific implementation-related activities; however, the word cloud alone does not establish the target or substance of the criticism. Neutral posts prominently feature “teacher,” “school,” and “children,” accompanied by “manager,” “principal,” “education,” and “student,” appearing consistent with institutional, descriptive, or program-related communication. Across the three sentiment categories, references to schools, teachers, and administrators remain central, while negatively oriented posts contain more visible references to projects, institutions, and named actors. Taken together, the word-cloud analyses identify recurring lexical patterns across the hashtag-based subsets; the next section examines broader patterns of word co-occurrence through topic modelling.

Topic Modelling

The LDA analysis generated three prominent topic patterns within each of the five hashtag-based subsets. Tables 4–8 present the mean topic probabilities, prevalence values, and interpretive labels assigned to these patterns. The topic labels should be understood as summaries of recurring word co-occurrences rather than as direct representations of stakeholder intentions, policy outcomes, or objectively distinct themes. Table 4 first presents the topic patterns identified among posts associated with #MaarifModel.

Table 4. Summary of topic modelling for the hashtag #MaarifModel

Topic No	Mean Probability	Topic Prevalence (%)	Main Themes
1	0.3863	39.47	Reflections of the Maarif Model on Education and Project Implementations
2	0.3207	30.52	New Educational Approaches and Institutional Models in the Century of Türkiye
3	0.2931	30.01	MoNE’s Vision for Curriculum, Teachers, and Education

Table 4 summarizes the three topic patterns generated for posts associated with

#MaarifModel. Based on the recurring word co-occurrences, these patterns were interpreted as relating to project-based educational practices, new institutional approaches within the Türkiye Century discourse, and references to MoNE's curriculum- and teacher-related vision. The following subsections describe the interpretation of each topic pattern in greater detail.

Hashtag: #MaarifModel

Topic 1: Reflections of the Maarif Model on Education and Project Implementations. The recurring terms within this topic suggest that posts associate the Maarif Model with project-based educational practices and a broader reform agenda. References to students, teachers, schools, local administrations, and ministry-level actors appear together, indicating that the discourse links implementation to multiple institutional levels. Mentions of exhibitions, courses, and related activities further suggest that the topic is framed around experiential and project-oriented forms of learning, with attention to both academic and broader social, cultural, and ethical development.

Topic 2: New Educational Approaches and Institutional Models in the Century of Türkiye. The word co-occurrences within this topic appear to connect the Maarif Model with the broader "Century of Türkiye" discourse and with references to new educational and institutional approaches. Mentions of schools, ministerial objectives, local contributions, teachers, and students suggest that the posts frame education as extending beyond curriculum content to include institutional organization and national development priorities. Within this discourse, teachers appear to be positioned as facilitators or guides, while students are presented as central participants in the educational process.

Topic 3: MoNE's Vision for Curriculum, Teachers, and Education. The recurring word patterns within this topic appear to associate MoNE's educational vision with curriculum renewal, teacher roles, and broader references to educational quality. Mentions of flexibility and innovation suggest that the posts frame curriculum reform as part of an effort to respond to changing educational needs. Teachers are portrayed not only as providers of knowledge and skills but also as actors supporting students' personal development. The co-occurrence of terms related to MoNE, teachers, professional capacity, and educational quality may indicate that the discourse connects teacher development and institutional sustainability with the broader reform vision. The topic patterns generated for posts associated with #MaarifModeloftheCenturyofTürkiye are presented in Table 5.

Table 5. Summary of topic modelling for the hashtag #MaarifModeloftheCenturyofTürkiye

Topic No	Mean Probability	Topic Prevalence (%)	Main Themes
1	0.3827	38.40	The Maarif Model of the Century of Türkiye: Implementations at School and District Levels
2	0.3426	34.95	Education, Sports, and Cultural Activities in the Century of the Republic
3	0.2747	26.65	National Education Vision and an Emerging Perspective on the Future

Table 5 summarizes the three topic patterns generated for posts associated with #MaarifModeloftheCenturyofTürkiye. Based on the recurring word co-occurrences, these patterns were interpreted as relating to school- and district-level implementation, educational, sports, and cultural activities, and the broader national education vision associated with the



reform. The interpretation of each topic pattern is presented below.

Hashtag: #MaarifModeloftheCenturyofTürkiye

Topic 1: The Maarif Model of the Century of Türkiye: Implementations at School and District Levels. The recurring terms within this topic suggest that posts connect the Maarif Model with implementation at school and district levels. References to students, teachers, administrators, activities, visits, and meetings appear to frame local educational institutions as important settings in which nationally articulated policies are communicated and put into practice. The co-occurrence of ministerial and local actors may indicate that the discourse portrays implementation as involving both central direction and local participation. However, these lexical patterns do not by themselves demonstrate the extent to which the model has been adopted or locally embraced.

Topic 2: Education, Sports, and Cultural Activities in the Century of the Republic. The recurring word co-occurrences within this topic suggest that posts associate the Maarif Model with educational experiences extending beyond classroom instruction, particularly sports, arts, and cultural activities. References to events organized across different regions of Türkiye appear to frame these activities as opportunities for students' multidimensional development. The co-occurrence of terms related to sports clubs, cultural participation, and regional activities may indicate that the discourse presents such opportunities as broadening the scope of education and potentially contributing to social cohesion. Within this topic, young people are portrayed as developing greater confidence and becoming active and productive participants in the second century of the Republic.

Topic 3: National Education Vision and an Emerging Perspective on the Future. The recurring terms within this topic appear to connect the Türkiye Century Maarif Model with a broader national education vision, global competitiveness, and future-oriented reform discourse. References to teachers, administrators, knowledge, and values suggest that posts portray the model as seeking to combine national priorities with contemporary educational expectations. The co-occurrence of future-oriented language and the motto "the future will be very beautiful" may indicate that the discourse frames the reform as contributing to long-term educational development. These lexical patterns, however, should not be interpreted as evidence that such outcomes have already been achieved. The topic patterns generated for posts associated with #FromRootstotheFuture are presented in Table 6.

Table 6. Summary of topic modelling for the hashtag #FromRootstotheFuture

Topic No	Mean Probability	Topic Prevalence (%)	Main Themes
1	0.4616	47.48	From Roots to the Future: District and Regional Educational Leadership
2	0.3312	33.48	Educational Model and Student-Centered Approaches in the Century of Türkiye
3	0.2073	19.04	Educational Vision Extending to the Future and Institutional Contributions

Table 6 summarizes the three topic patterns generated for posts associated with #FromRootstotheFuture. Based on the recurring word co-occurrences, these patterns were interpreted as relating to district- and regional-level educational leadership, student-centered educational approaches, and institutional contributions to a future-oriented vision of education. The interpretation of each topic pattern is presented below.

Hashtag: #FromRootstotheFuture

Topic 1: From Roots to the Future: District and Regional Educational Leadership. Within this topic, references to projects, administrators, teachers, and local institutions bring district- and regional-level educational leadership to the foreground. Their co-occurrence suggests that the posts frame implementation as a coordinated process involving contributions at both institutional and individual levels. The discourse also associates this coordination with local engagement and efforts to improve students' educational environments. These associations represent how leadership and local implementation are portrayed in the posts rather than providing evidence of actual adoption or improved educational outcomes.

Topic 2: Educational Model and Student-Centered Approaches in the Century of Türkiye. At the center of this topic is a student-focused educational vocabulary that brings together references to learners' interests, abilities, and contemporary needs. The posts appear to portray education as extending beyond the transmission of knowledge toward a more holistic understanding of personal development. Within this framing, academic learning and social life skills are presented as complementary dimensions of students' growth. The topic therefore appears to reflect an aspirational view of student-centered education rather than demonstrating that these outcomes have been achieved in practice.

Topic 3: Educational Vision Extending to the Future and Institutional Contributions. References to MoNE, provincial directorates, schools, and teachers place institutional coordination at the center of this topic. Their co-occurrence may suggest that the posts portray the implementation of the Maarif Model as depending on contributions from actors operating at different levels of the education system. A shared future-oriented vision is presented as a means of connecting the broader "Century of Türkiye" discourse with local educational practice. Rather than demonstrating successful coordination in practice, however, the topic reflects how institutional collaboration is represented within the posts. The topic patterns generated for posts associated with #TheFutureWillBeVeryBeautiful are summarized in Table 7.

Table 7. Summary of topic modelling for the hashtag #TheFutureWillBeVeryBeautiful

Topic No	Mean Probability	Topic Prevalence (%)	Main Themes
1	0.4946	50.00	The Future Will Be Very Beautiful: Provincial-Level Education Meetings
2	0.2803	29.21	Century of Türkiye Maarif Model: Provincial Directorates and Visionary Approaches
3	0.2251	20.79	School Visits and Future Outlook with Students

Table 7 presents the three topic patterns generated for posts associated with #TheFutureWillBeVeryBeautiful. The patterns were interpreted as relating to provincial-level education meetings, administrative visions connected with the Maarif Model, and school visits framed in future-oriented terms. Rather than representing fixed or objectively separate themes, these labels summarize the main word co-occurrences observed within the subset. The interpretation of each topic is outlined below.

Hashtag: #TheFutureWillBeVeryBeautiful

Topic 1: The Future Will Be Very Beautiful: Provincial-Level Education Meetings. Provincial-level meetings and the involvement of education administrators form the main



lexical focus of this topic. References to evaluation, decision-making, challenges, and future-oriented planning suggest that the posts portray these meetings as settings in which educational priorities are reviewed and possible responses are discussed. The prominence of provincial directorates and educational leaders further indicates that administrative coordination is central to the way this discourse frames reform-related activity. The topic therefore captures a future-oriented administrative narrative rather than providing evidence that the meetings produced specific improvements in educational practice.

Topic 2: Century of Türkiye Maarif Model: Provincial Directorates and Visionary Approaches. A second pattern centers on provincial directorates, local programs, and future-oriented language associated with the Maarif Model. References to teachers, students, and province-level activities suggest that the posts portray local administrations as intermediaries between the national reform vision and its communication in educational settings. The motto “the future will be very beautiful” contributes a hopeful tone to this discourse and appears to frame provincial initiatives as aligned with broader national objectives. Accordingly, the topic reflects an optimistic administrative narrative surrounding implementation rather than demonstrating that these activities have accelerated nationwide adoption or improved educational outcomes.

Topic 3: School Visits and Future Outlook with Students. School visits provide the central organizing vocabulary of this topic, with references to MoNE, provincial directorates, teachers, students, and parents appearing together. These associations suggest that the posts present visits as occasions for communicating the reform vision directly within school settings and for engaging with different members of the school community. References to students and the future may also indicate that the visits are framed in participatory and hopeful terms. Even so, the topic reflects how these activities are represented in the discourse and does not establish whether they strengthened participation or produced lasting effects. Table 8 presents the topic patterns generated for posts associated with #TürkiyeCenturyMaarifModel.

Table 8. Summary of topic modelling for the hashtag #TürkiyeCenturyMaarifModel

Topic No	Mean Probability	Topic Prevalence (%)	Main Themes
1	0.4253	45.47	The Century of Türkiye Maarif Model: National Education Vision and Local Participation
2	0.3226	30.83	Regional Stakeholders and Ministry Coordination in Education
3	0.2521	23.70	Students, Teachers, and the Education Program of the Century

Table 8 outlines the three topic patterns generated for posts associated with #TürkiyeCenturyMaarifModel. The patterns were interpreted as relating to the national education vision of the reform, coordination among regional and ministerial actors, and the roles of students and teachers within the emerging educational framework. These labels summarize recurring word associations in the posts and should not be read as direct evidence of policy adoption, institutional effectiveness, or stakeholder agreement. The topics are examined individually below.

Hashtag: #TürkiyeCenturyMaarifModel

Topic 1: The Century of Türkiye Maarif Model: National Education Vision and Local Participation. A prominent feature of this topic is the association between nationally

articulated reform language and references to provincial- and district-level activities. Mentions of meetings, projects, collaborations, and local actors suggest that the posts frame implementation as a process through which the central education vision is communicated and interpreted in local settings. References to holistic development further appear to represent the reform's stated aspirations rather than observable outcomes. The topic therefore captures a discourse of central–local alignment without demonstrating the extent of actual local adoption or implementation effectiveness.

Topic 2: Regional Stakeholders and Ministry Coordination in Education. The vocabulary grouped within this topic brings provincial directorates of national education, district governorships, local governments, and MoNE into the same institutional frame. Their co-occurrence suggests that the posts portray implementation as relying on coordination between central and regional actors. Within this discourse, such coordination is associated with translating educational policy into local practice rather than leaving it at the level of formal policy. This representation should not, however, be taken as evidence that the coordination described in the posts necessarily produced practical outcomes.

Topic 3: Students, Teachers, and the Education Program of the Century. Students and teachers occupy the foreground of this topic, alongside references to the educational program, knowledge, and skills. These associations suggest that the posts portray students as the principal beneficiaries of the reform and teachers as central actors in its implementation. The discourse also presents the program as oriented towards equipping learners with knowledge and competencies considered relevant to contemporary life. Rather than confirming how these roles and objectives are enacted in practice, the topic captures an aspirational representation of the reform's intended educational framework. The following synthesis brings together the main patterns identified across Tables 4–8.

Taken together, the topic patterns suggest that discourse surrounding the Maarif Model extends beyond curriculum change to encompass teacher roles, student development, institutional coordination, and future-oriented values. Across the dataset, positively classified posts predominate, whereas negatively classified posts contain more prominent references to projects, targets, scope, and implementation-related concerns. The LDA results further point to a recurring discursive connection between nationally articulated reform goals and their representation in local educational settings. At the hashtag-subset level, posts associated with #MaarifModel contain a relatively greater share of critical or contested expressions, while discourse associated with #FromRootstotheFuture appears more closely aligned with positively oriented institutional communication.

Discussion

The findings should first be read through the lens of policy feedback theory. Policies do not only produce formal implementation outcomes; they also reshape how stakeholders interpret state action, assess institutional credibility, and publicly express support or dissatisfaction (Mettler & SoRelle, 2018; Pierson, 1993). From this perspective, the high positive sentiment surrounding the Maarif Model should not be interpreted as straightforward acceptance of all curricular and implementation details. Rather, it indicates that the reform's symbolic language, especially its emphasis on values, national vision, and the future, has achieved substantial visibility within hashtag-based discourse. This aligns with the Ministry of National Education's (2024) positioning of the model as a holistic framework combining values, skills, and national identity. Yet the word-frequency and topic-modelling results show



that symbolic support coexists with concerns about practical enactment. Similar tensions appear in teacher-focused studies, where values education, national consciousness, individual development, and social integration are often recognized as strengths, while implementation-related uncertainty remains visible (Bağcivan et al., 2025; Duyul et al., 2025; Seyyar & Aydın, 2025). The main contribution of the present study is to show that this tension also appears in spontaneous digital discourse.

A second interpretation concerns the difference between broader public hashtags and institutionally aligned dissemination hashtags. #MaarifModel appears to function as a broader and more contested discussion space, whereas hashtags such as #FromRootstotheFuture and #MaarifModeloftheCenturyofTürkiye more strongly reflect the official vocabulary of the reform. This difference may indicate digital polarization, but it may also reflect a functional distinction between organic public discussion and organized institutional communication. Broader public hashtags are more likely to attract criticism, irony, complaint, and disagreement because they are easier for diverse users to appropriate. Institutionally aligned hashtags, by contrast, may circulate more frequently through institutional accounts, school-level announcements, and coordinated local activities, which can increase the visibility of supportive language. In this sense, hashtag-level differences are not merely sentiment differences; they show how platform affordances and institutional communication strategies shape what becomes visible as “public reaction” (Bruns & Burgess, 2015; Papacharissi, 2014).

The methodological implication is equally important. Real-time digital feedback should not replace surveys, interviews, classroom observations, or formal evaluation studies, but it can complement them within an adaptive policy-evaluation cycle. Social media analysis can help policymakers identify emerging concerns, detect communication gaps, and recognize the difference between support for policy ideals and skepticism about implementation. For a large-scale reform such as the Maarif Model, this means that digital discourse can serve as an early diagnostic layer: when terms related to projects, targets, meetings, and administrative actors repeatedly appear in negative contexts, policymakers can treat these patterns as signals for further qualitative inquiry rather than as definitive evidence on their own. This use of digital feedback is consistent with a text-as-data approach in social science, where computational methods are most useful when they are connected to theory, context, and cautious interpretation (Grimmer et al., 2022).

The negative clusters make the implementation problem more visible. Terms such as “project,” “target,” “scope,” “workshop,” “opening,” and “director” suggest that the central issue is not necessarily rejection of the reform idea, but concern about how the reform is translated into school-level obligations. This finding is consistent with studies reporting administrative pressure, documentation burdens, time constraints, and the need for clearer school-level support in the implementation of the Maarif Model (Burgul Adıgüzel & Karakuş Aktan, 2025; Düğmeci & İlik, 2025; Fırat, 2025; Güven & Yumugan, 2025; Küçük & Kurt, 2025). The resulting paradox is important: in the reform narrative, the teacher is positioned as a central agent of renewal, but in the negative digital discourse, the teacher appears as an implementer exposed to project intensity and bureaucratic monitoring. This tension helps explain why the school–teacher–student triangle is so persistent across sentiment categories. These concerns are also echoed in studies reporting insufficient preparation, the absence of pilot implementation, and the need to extend training to administrators to strengthen school-level commitment (Baz, 2024; Sarigoz et al., 2025). Broader uncertainties among stakeholders further shift discussions toward systemic burdens rather than the model’s

programmatic specifics, indicating gaps in understanding or dissemination of the reform's innovations (Keleş & Cırık, 2025). Users appear to judge the reform not by its policy vocabulary alone, but by its perceived effects on classroom time, teacher workload, and the possibility of meaningful learning.

These findings should also be interpreted in light of well-established limitations in social media research. Posts on X do not represent the general population, and platform users may differ from broader society in politically and demographically important ways (Mellon & Prosser, 2017). In addition, social media data are shaped by self-selection, platform-specific sampling constraints, API access conditions, and algorithmic curation, all of which may amplify some forms of expression while making others less visible (Bucher, 2018; Morstatter et al., 2013; Ruths & Pfeffer, 2014). Automated, semi-automated, or coordinated accounts may further distort apparent patterns of public discourse (Ferrara et al., 2016; Orabi et al., 2020). The study reduced this risk through duplicate removal, relevance screening, and rule-based bot/noise filtering, but it cannot claim complete elimination of such activity. A further limitation concerns model validation. Because the dataset did not include an independently coded gold-standard validation subset, the BERT-based sentiment outputs are interpreted as model-assisted classifications rather than externally validated supervised predictions. This limitation does not invalidate the observed sentiment patterns, but it requires caution when interpreting exact category boundaries. For this reason, the findings are best understood as indicators of digitally expressed stakeholder reactions, not as representative measures of society or definitive proof of implementation quality.

Conclusion

This study suggests that social media discourse surrounding the Maarif Model is characterized by a tension between symbolic support and practical skepticism. The predominance of positive sentiment may reflect the reform's visibility as a national and values-based vision; however, such symbolic approval should not be interpreted as confidence in classroom implementation. The findings further suggest that the reform's practical legitimacy may depend on the extent to which teachers, students, and schools experience its implementation as pedagogically meaningful and manageable.

The main concerns appear to center on project intensity, targets, administrative communication, and centrally coordinated implementation. The prominence of these terms suggests that the discourse is not limited to the reform's underlying aims but also reflects concerns about workload and the institutional practices through which implementation becomes visible at the school level. This pattern has important policy implications. Supporting the long-term sustainability of the Maarif Model may require implementation strategies that extend beyond symbolic visibility by providing clearer guidance, reducing unnecessary administrative burdens, and strengthening professional support for teachers.

Across the findings, the relationship among schools, teachers, and students emerges as a central theme. The discourse suggests that stakeholders may evaluate the reform through its perceived implications for everyday educational practice rather than through official policy language alone. Within this relationship, teachers occupy a particularly prominent position. If implementation is experienced primarily in terms of paperwork, monitoring, and project-related demands, the reform may risk losing some of its pedagogical meaning. Teacher well-being and professional agency may therefore be important considerations in the transition from symbolic support to practical legitimacy.



Used with appropriate caution, digital feedback may offer a valuable complement to established approaches to educational policy evaluation. Although discourse on X should not be treated as representative of public opinion, it can provide early indications of contested meanings and emerging implementation concerns. The study illustrates how computational analysis of publicly expressed discourse can complement surveys, interviews, observations, and other traditional evaluation methods. In the case of the Türkiye Century Maarif Model, an important consideration is not only whether the reform receives positive attention but also whether it can evolve into a practical system that meaningfully supports the teachers, students, and schools involved in its implementation.

Future research could extend the present analysis through comparisons across regions, school levels, stakeholder groups, and different stages of implementation. Combining social media data with interviews, classroom observations, and independently validated sentiment-classification procedures would provide a more comprehensive account of the Maarif Model as both a policy narrative and an educational experience. Longitudinal and mixed-method studies may also help distinguish institutional dissemination efforts from more spontaneous criticism, temporary controversy, and concerns that persist throughout implementation.

Declarations

Conflict of Interest: *The authors declare that they have no competing financial interests or personal relationships that may have influenced the work reported in this paper.*

Funding: *This study received no external funding.*

Ethics Statements: *As the study used publicly available X posts and involved no direct interaction with human participants, formal ethics approval was not required under the applicable institutional procedures and was therefore not sought.*

Data Availability: *The derived dataset or post identifiers may be made available upon reasonable request, subject to platform terms, ethical considerations, and data protection requirements.*

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