

## **A Corpus-Based Study of Austen's Novel *Pride & Prejudice* using Cirrus Tool**

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### **ABSTRACT**

Previewing approach develops reader's cognition and presents an epigrammatic digital understanding of the text. The visual representations of knowing a word cloud produces an everlasting impact on the memory slate of the reader. The study aims at constructing an interactive cirrus word cloud preview based on statistical data that will help the readers to preview the extracted major themes and important characters in Jane Austen's novel *Pride & Prejudice*. The study addresses the main research question: How does Cirrus tool reveal significant characters and themes of Austen's novel *Pride & Prejudice*? A mixed method approach was applied to find out the significant characters and themes in *Pride & Prejudice*". The findings reflect that Cirrus tool can quickly extract 59 words from the novel, the most frequent 59 words/themes were found in Voyant Tools from the complex text. The corpus of the text of the novel "*Pride & Prejudice*" represented the main characters and the themes.

**Keywords:** corpus, cirrus, word cloud, themes, Austen's, previewing, prejudice.

### **1. Introduction**

The study falls under the discipline of Corpus Linguistics. The term "Corpus" means "body" may be used to refer to the investigation of linguistic phenomena by means of written or spoken material. However, in modern linguistics this term refers to large collection of text which represents a sample of a particular variety or use of language that are presented in machine readable form with using various types of software (Javed, Javed, Ahmed, & Anjum, 2019).

The purpose of the study is to the preview the extracted important themes and the major characters applying Cirrus tools in the form of word clouds, which fall within the domains of Corpus Linguistics. A 'word cloud' or Cirrus is a visual and statistical representation of the central themes and word frequency of the uploaded text. The tool can be incorporated with teaching of literature in classroom. It has been observed that majority of the students remain unaware of the consistent patterns of knowledge, key concepts, important themes and major characters in the literary text. Therefore, visual representation of cirrus helps the readers to look for brief ideas before reading the entire text. So, for the sake of developing and quick

understanding of the literary text (Sinclair & Rockwell, 2015) introduce the Cirrus tool as part of the Voyant tools. Cirrus is a useful tool for the students and the teachers to find out the major themes and the important characters in the form of Cirrus word cloud.

### **1.1. Background of the Study**

Corpus linguistics has incorporated the natural language processing with computers. In recent years, the use of computer technology in language research and teaching has grown rapidly. Milgram, a leading word cloud pioneer, employed word clouds in 1970s to identify the frequency of word from the complex text. Millen et al (2004) also employed word clouds to find out the high frequency words in "dogear" a bookmarking project. The availability of computers and machine-readable texts and the use of various types of software have made it possible to obtain the data quickly. Such as Voyant Tools is a web-based application for text analysis that can be used virtually, aimed at facilitating reading and interpreting activities for its users. Voyant Tools software technology produces effective findings of the main themes in the text using previewing technique. Previewing is a technique of skimming a book or text to obtain a possible quick understanding of the key themes and characters without completely reading the text (Ullah, Uzair, & Mehmood, 2019).

The technological integration in this study is the Cirrus tool that can quickly extract most possible themes and identify the most frequent words that may be utilized to preview any linear or nonlinear text; therefore, this tool can be incorporated with teaching of literature in classroom.

### **1.2. Significance of the Study**

The study has significance as the Voyant tool enables the readers to observe the social themes through the canvas of literature (Hassan et al., 2021; Masood et al., 2020c) moreover, Voyant Tools are important for extracting possible themes from literature (Ullah et al., 2019, 2020). It's difficult to read all the text, so previewing techniques enable the readers to search for brief points of view even before reading the entire text. The majority of the students at university level are ignorant of the text's uniformed knowledge patterns, key aspects, themes, and prominent characters. So, for the sake of academic needs of (BS English) students, Rockwell and Sinclair (2015) introduce the Cirrus tool as a part of Voyant tools. As a result statistical data in the form of possible themes and most frequent words are produced by this tool. The study may contribute in the repertoire of Corpus Linguistics and teaching literature using software.

## **2. Literature Review**

A study of word clouds derived from different texts should quickly reveal Carmel Disparities such as technology use, teaching and learning using technology, and views of eLearning techniques in the topics covered in different writings (McNaught & Lam, 2014). Different models should be investigated in researches for advancement in the field (Masood et al., 2020d). Therefore, the study was conducted to see if the word-cloud methodology may be a useful tool for the qualitative text analysis. Word clouds are often interpreted in terms of the most common words, attention to missing words or infrequent words might be just as essential. The context in which a word cloud is generated also plays a crucial impact in the interpretation of the resultant word clouds e.g., educators have also begun to remark on the advantages of using word clouds in the classroom (Ullah, Arif, & Qaisar, 2020).

The larger the size of words in a word cloud, the higher the frequency of those words in the corpus. A word cloud's frequency and important words were not in harmony. Another drawback of word clouds was that they did not give context for words and did not group similar versions of a stem word together in the word cloud. To reduce ambiguity, the context must be read along with the analysis of the word cloud (Ramsden & Bate, 2008). In order to prevent ambiguity, the context was essential. Clarity of views was made possible by the Contexts tool. The Contexts tool offered context for vision clarity. Previewing became an error-free knowledge extraction activity because to the collaboration of the contexts tool and the word cloud. This alternative was not considered in the present research.

There were several applications for word clouds in various fields of study. Word clouds were used to summarise the whole corpus data set. As a result, word clouds were beneficial for summarising diverse interviews (McNaught & Lam, 2010). For summarising purposes, the same method may be used to any linear or nonlinear text.

Jannidis (Burrows, 2002, p. 267) conducted a similar analysis in which Voyant techniques were used to 350 Canonical German books. As a result of the study's data visualisation and statistics, new and fascinating knowledge patterns were discovered. Terms of scale, this research was unable to identify each novel's theme for its readers. Another research was done using Voyant techniques on all of Jane Austen's works (Sinclair & Rockwell, 2015). It also dealt with large amounts of textual data. Similarly, Yeats (2013) created word clouds from 1500 apocalyptic fictions. Because of the utility and result-oriented character of Voyant tools, a variety of studies were conducted, including Shakespeare's 37 plays, Jane Austen's whole work, and George Eliot's *Mill on the Floss* by George Eliot Harry Potter books and Sherlock Holmes novels were mined with Voyant's software.

Masood et al., (2020a, 2020b) found the importance of Voyant Tools in pedagogy. Siddiq (2021a, 2021b) have made a significant contribution in the study and found that corpora could be utilized for literature learning as they are liked by students. Ullah et al., (2019, 2020) found that beneficial results can be achieved by using Voyant Tools in literature classroom (Masood & Shafi et al., 2021 e). The previous studies suggest the gap in the previous literature which needs to be filled. So, in the current research the similar aforementioned models have been applied on Austen's *Pride and Prejudice* for corpus based research utilizing Voyant Tools. This study aims to extract the most possible themes and to identify the most frequent words in the form of word cloud. To achieve the afore mentioned aim, this research paper addresses the following research question:

How does Cirrus tool reveal significant characters and themes of Austen's novel *Pride & Prejudice*?

### **3. Research Methodology**

The current study used a mixed-methods approach. The quantitative technique calculated the frequency of word occurrences, but the qualitative technique entailed interpreting the data.

Jane Austen's novel "*Pride & Prejudice*" was purposely selected to generate the corpora of the text. The text the novel was first tagged on Voyant and then analyzed using Cirrus software. The word list has been evaluated in order to identify high frequency terms and word clouds for the modelling of topics and their influence and themes. The word cloud was produced

as a PNG image at first because it provides a well-defined picture of the words and frequencies of the Cirrus words. In addition, these words were also manually recognized and categorized into each type of theme as well as its meanings.

When the word Cirrus was converted as PNG picture to a word file, the amount and number of the most frequently used words were insufficient. To address this shortcoming, the Summary function in Voyant was repurposed to collect quantitative data on the first 59 most frequently used words, which was then placed beneath Cirrus. As a result, word clouds, full corpora, and statistical data are frequently accessed online simply by holding down CTRL and clicking on any yellow colour theme inside a word document.

### **3.1. Theoretical Framework**

The study followed Rakesh Aggrawal's Knowledge Discovery Theory in Data Mining (KDD) to extract unfamiliar, interesting and beneficial knowledge patterns (Cabena, Hadjinian, Stadler, Verhees, Zanasi, 1998).

It comprised of several areas, like hermeneutics, IA and machine learning (Fayyad, Shapiro, Smyth, & Uthurusamy, 1996). The term 'hermeneutics' is derived from the ancient Greek language refers to the process of understanding a text, such as plays or novels, speeches, or symbolic expressions. However, it's also used to describe attempts to theories the conditions that allow for such interpretation. The TPACK paradigm (Koehler & Mishra, 2009) justified the utilization of technology for learning objectives by integrating technology, pedagogy, and content.

### **3.2. Research Instrument**

To evaluate the data and to achieve the objectives of the study, Cirrus tools in Voyant tools were used. The research strategy was to upload a pdf file of the novel 'Pride & Prejudice' to the Voyant software, which then showed its data in the form of most frequent words.

## **4. Results and Discussion**

This study visualizes Jane Austen's novel 'Pride & Prejudice' in a word cloud to present its most possible themes and characters as a previewing technique. It generates word cloud with Cirrus tool. It produces interactive word cloud and a number of themes which can be searched from 25 to 500 but in this research the first 59 most frequent words used for results and discussion. So the following word cloud shows topic modelling, character and most possible theme extraction.

### **4.1. Summary Tools Data**

Jane Austen's language in her novel corpus represented her main characters and themes. These 59 words are Jane Austen's most frequent 59 words/themes found in Voyant Tools after summary tool analyses.



Figure 1. Word cloud of Jane Austen’s novel Corpus

mr (442); elizabeth (361); darcy (184); bennet (182); mrs (175); jane (172); said (164); bingley (133); miss (102); good (85); time (85); lady (84); lydia (83); sister (82); soon (82); wickham (82); know (79); collins (78); little (74); room (67); mother (65); man (63); dear (61); thought (61); family (60); away (58); letter (58); father (57); came (56); chapter (56); day (54); garden (52); saturday (51); catherine (50); kitty (50); lizzy (50); young (50); left (49); make (49); oh (49); great (47); house (47); replied (47); think (47); way (47); friend (46); looked (46); marriage (46); longbourn (43); saw (43); long (42); love (42); netherfield (42); sisters (41); sure (41); feelings (40); tell (40); married (39); morning (39)

Table1. Character representation in frequency

Sr	Character	Frequency
1	Elizabeth	361
2	Darcy	184
3	Bennet	182
4	Jane	172
5	Bingley	133
6	Lydia	83
7	Wickha	82
8	Collins	78
9	Gardiner	52
10	Catherine	50
11	Kitty	50
12	Lizzy	50

Table 1 shows that there are significant characters in *Pride & Prejudice*. The important characters of the novel are “**Elizabeth (361)**,” “**Darcy (184)**,” “**Bennet (182)**,” “**Jane (172)**,” “**Bingley (133)**,” “**Lydia (83)**,” “**Wickham (82)**,” “**Collins (78)**,” “**Catherine (50)**,” “**Kitty (50)**” and these are the key characters in Jane Austen's Novel *Pride and Prejudice* Corpus with a variety of frequencies. Elizabeth (361) and Darcy (184) represent the major character in the novel. Darcy and Elizabeth's relationship is hampered by Darcy's pride and Elizabeth's prejudice, according to Jane Austen. The word Bennet (182) represents Mr. and Mrs. Bennet. Mrs. Bennet is vulgar and discreet, but Mr. Bennet is bright and witty. The word Jane (172); Bingley (133) shows an ideal marriage in *Pride and Prejudice*. They are sincerely in love with each other. Bingley (133); Lydia (83), they eloped before they get married. Collins is a pretentious priest who is often idiosyncratic and stands to bear the property of Mr. Bennet. The word Catherine (50) represents is a wealthy, domineering noblewoman who is Mr. Collin's patron and Darcy's aunt. Lady Catherine exemplifies class snobbery, particularly in her attempts to separate the middle-class Elizabeth from her well-bred nephew. Another character is Kitty (50) the fourth Bannet “**sister (82)**” is also girlishly captivated by the troops, as is Lydia. Mrs. Bennet's brother and his wife are represented by the term Gardiner (52) they're somewhat sketchy as characters. Mr Gardiner enjoys fishing, and Mrs “**Gardiner (52)**” cannot walk very far – yet both of these characteristics serve to advance the plot during the Pemberley visit by providing opportunities to meet Darcy. They play an important role in the development of the narrative and thematic

framework of the novel throughout, although we don't learn much about them. **“Lizzy (50)”** Elizabeth Bennet is the protagonist of Jane Austen's 1813 book *Pride and Prejudice*. Her friends and relatives frequently refer to her as Eliza or Lizzy. Elizabeth is the second of five girls in her family.

Table 2. Themes representation in frequency

Sr.	Themes	Words	Frequency	Sr.	Theme	Words	frequency
1	Dialogic theme	Said	361	11	Theme of family	Family	60
		Say	51			Sister	82
		Tell	40			Sisters	41
2	Themes of respect	Mr	442	12	Themes of youth	Youth	51
		Mrs	175				
3	Aristocracy	Miss	102	13	Emotions/affection	Feelings	40
						Make	49
						Dear	60
						Oh	49
4	Praising	Good	85	14	Theme of time	Time	85
		Great	47				
5	Antithetical binaries	Lady	84	15	Theme of commitment	Soon	82
		Man	63				
		Came	56				
		Left	49				
6	Themes of knowledge	Day	54	16	Theme of displacement	Away	58
		Morning	39			In time	47
		Know	79			and place	
7	Themes of marriage	Married	46	17	Theme of friendship /trust	Friend	46
		Marriage	39				
8	Themes of love	Loved	42	18	Theme of argument	Red	47
9	Conscious of Limitations	Room	67	19	Two inches of ivory	Little	74
		House	47				
		Long	43				
		ourn	42				
		Nether field					
10	Conscious thinking	thought	61	20	Theme of certainty	Sure	41
		Chapter	56				
		Think	47				

Table 2 shows that there are most possible themes in *Pride & Prejudice*. The most possible themes of the novel are:

**Dialogic Theme: "Said (164)"** is the most frequent statistical reason of the novel, since the novel characters talk directly together. The plot of the work proceeds with talks and all characters develop situations and understand them carefully. Another essential subject is

"**Say (51)**" which indicates that characters generally speak directly and transmit their sentiments of sympathy. Especially, regarding their love, money, manners marriage and social life. There is also another thing worth noting about the words "**tell (40)**" referring to their use in basic forms. Base forms of words are usually employed in future tense discourse, though they can also be used with first-person singulars in the present tense. We may conclude from that the subject of future and first-person narration is evident in the dialogues of the characters as well. They demonstrate that, for the most part, characters actively discuss and express their deep and profound sentiments, particularly those linked to their friendships, love relationships, likes, dislikes, childhood, boyhood or girlhood.

**Theme of Respect:** Term "**Mr.**"(442) and "**Mrs.**" (175) are significantly used throughout the novel, and it is mentioned every time the names of male and female characters. Darcy offends Elizabeth with his insulting remarks about her family in his first proposal: "Could you expect me to revel in the inadequacy of your connections?" However, when Elizabeth investigates her judgments and Darcy recognizes his faults, they finally reach a mutual respect, which allows their love to blossom. Term Mr. and Mrs. Show that male character are prominent rather than female characters because Mr. (442) is most frequent word rather than Mrs. (175).

**Aristocracy:** The term "**Miss**" (102) refers to upper-class females whose lives consisted of a never-ending cycle of dances, meals, cards, and visits to friends and family. They were not required to do any household chores. As a result, "women" lived in comfort and leisure, focused with society, children, and marriage. Therefore upper class females were tried to engage poor to do work in their house and fields.

**Praising:** The theme of praise appears frequently throughout Jane Austen's novel Corpus. Jane Austen's novels have depicted both good and evil, but virtue is always predominant. With a high frequency, the word "**Good**" (85) has portrayed the idea of goodness and praise. "**Good**" (85) is a word used by the guardians to their unmarried daughters. This term also represents the expression of honoring some characters' acts and statements. The concept of honoring daughters and noble characteristics is also apparent in the usage of the word "**Great**" (47) to qualify characters in the corpus.

**Antithetical Binaries:** It is clear from a critical review of the Jane Austen Corpus that opposing concepts are being propagated. There are several words that have demonstrated the opposite nature of ideas and both the opposing ideas emerged as major themes of Jane Austen. There are some other antithetical binaries in the Jane Austen's novel Corpus which present opposite themes like "**lady**" (84), "**man**" (63), "**came**" (56) and "**left**" (49) The former three are complementary antithetic binaries and the latter two are the relational antithetic

**The theme of Knowledge:** The word "**day**" (54) is one of the most general and fundamental symbols of liberty, hope, and goodness. It is the essential and universal emblem for images of otherworldliness, divinity, and spirituality, as well as enlightenment and wisdom. "**Morning**" (39) depicts a cheerful start to the day. According to Nurmela (2021), "Smile in the mirror. Do that every morning and you'll start to see a big difference in your life." The day is a fountain of kindness and a definitive reality, and it leads with greatness into the Buddhist doctrine of Nirvana. Its source is the sun, and it is a malice fighter. The theme of the day is information, knowledge, and intellect. Morality, purity, virtue, and ideals are also connected with light. Throughout the day, the manly standard of progress is depicted. The day is synonymous



with grandiose vibrancy, innovative strength, optimism, and faith. This theme is further contrasted with the use of the term **“know” (79)** which reveals the idea of knowing.

**Theme of Guardians:** Term **“mother”(65)** and **“father” (57)** are significant throughout the novel, and it is mentioned every time the names of “guardians.” Mr. Bennet plays guardian’s role in the novel. He is a middle-class gentleman with five unmarried daughters. Mr. Bennet’s wife is a loud, obnoxious woman whose main ambition in life is to see her daughters marry.

**Theme of Marriage: “marriage” (46)** and **“married” (39)** In Jane Austen’s time, marriage was a major social issue, and she was well aware of the drawbacks of being unmarried. As mentioned by Austen in *Pride & Prejudice*, “It is a truth universally acknowledged that a single man in possession of a good fortune must be in want of a wife.” Jane Austen explains positive and negative reasons for marriage via five marriages. The whole literary novel revolves on marriage.

**Theme of love:** In *Pride and Prejudice*, **“love” (42)** is the most important theme. The love story of Elizabeth Bennet and Mr. Fitzwilliam Darcy illustrates how love may triumph over pride, prejudice, and even social hierarchies. Jane Austen uses the work to argue that real love is priceless and can overcome any obstacles.

**Conscious of limitation: “room” (67), “house” (47), “Longbourn” (43) and “Netherfield” (42).** Jane Austen’s narrative centres on Nether Field, Long Burn, Hansford, Parsonage, Merton, and Pemberley. There is no mention of nature at all. Jane Austen’s protagonist was imprisoned indoors. Her settings include polished leisure class drawing rooms, ballrooms, civilized leisure class parks, and gardens.

**Conscious Thinking:** The theme of **“thought” (61)** is also prevalent throughout the narrative, as all characters develop hypotheses and then attempt to testify to their views. **“Think” (47)** Mr. and Mrs. Bennet consider their two unmarried daughters, Darcy and Elizabeth their pride and prejudice.

**Theme of Family:** The theme of **“Family (60)”** in *Pride and Prejudice* is the most important social unit, and it is also the novel’s emotional center. Austen knowingly indicates that Jane and Elizabeth are molded into the family as a mature, intelligent adult, and Lydia as an unhappy idiot. The words **“Sister” (82)** and **“Sisters” (41)** represent different personalities of Jane and Elizabeth in *Pride and Prejudice* and their differences in character and temperament, Jane and Elizabeth are loyal sisters in *Pride and Prejudice*. Jane is calm, humble, timid, and hesitant to criticise anybody, but Elizabeth is vivacious, funny, and quick to form judgments and criticise.

**Theme of Youth: “young” (50)** Jane Austen’s work *Corpus* explores several concepts associated with young age. According to Mr. Darcy’s letter to Elizabeth, his father died 5 years ago, and Mr. Wickham deceived Georgiana after that when she was 15 years old. So, Miss Darcy was roughly 20 years old at the time, and as she was more than ten years younger than Mr. Darcy, Mr. Darcy was 30 years old and still unmarried.

**Emotions / Affection:** Emotions and affection are central themes in Jane Austen’s work *Corpus*. **Feelings (40);** also depicts a symbol of love Positive emotions and powerful mental

states embrace love. Love is described as a magnificent virtue, and it is earthlier in character than the spiritual one. **“make” (49)** the word ‘make’ represents emotions and feelings about love for instance, Family love, expressed primarily by the love of one another's in especially by the love between Jane and Elizabeth; it is reflected also in the relationships of Elizabeth to her father and Romantic love represented by Lydia and Mr. Wickham, Jane and Mr. Bingley, Elizabeth and Mr. Darcy. The word **“dear” (61)** and **“oh” (49)** are represented in the conversations to demonstrate emotions, feelings, attraction, and connection. These key terms represent the major themes in Jane Austen's corpus.

**Theme of time:** Past, Present, and Future: The novel's central premise is **“time” (85)** characters think about their Past, Present, and Future.

**Theme of Commitment:** The theme of Commitment is also much prevalent in the Pride & Prejudice Corpus. The word **“soon” (82)** is the representation of the hope and commitment. Mrs. Bennet considered that her unmarried daughters will marry soon.

**Theme of Displacement in Time and Place:** The word **“away” (58)**, **“long” (42)** and **“way” (47)** represent displacement of time and place and the struggle or destination in the Pride & Prejudice Corpus. Elizabeth rejects Darcy's initial proposal but accepts it a second time and they travel a long journey from one location to another numerous times during the novel.

**Theme of Friendship/Trust:** The word **“friend” (46)** In "Pride and Prejudice," Jane Austen discusses various friendships, each of a distinct kind. Friendship is shown as changeable, profound, and enduring, and as allowing for love and respect as long as the other conforms to your criteria. In other words, friendship in "Pride and Prejudice" is shown similarly to how it is in real life. Mrs. Bennet and Lady Lucas' relationship is one of the first that a reader observes in "Pride and Prejudice." Elizabeth Bennet and Lady Lucas' daughter, Charlotte, form the next friendship discussed in "Pride and Prejudice." The third and last important friendship in "Pride and Prejudice" is the most significant of them all. This is Mr. Darcy and Mr. Bingley's friendship.

**Theme of Argument:** The word **“replied” (47)** depicts the theme of argument. In Pride and Prejudice, the characters often answer to the other person in obeying and defying manner. They accept and reject the argument by replying them in soft and hard manner. This theme also depicts the notion of independency that character even women are free to speak and argue.

**Two Inches of Ivory:** This theme is supported by the word **“little” (74)**. In Pride and Prejudice, Austen has presented very little world. She has shown the selected problems of selected people from selected place and bound her whole novel in a little place with little domestic problems with the theme of **“marriage (46)”**.

**Theme of certainty:** The theme of certainty is presented by word **“sure” (41)** in the corpus of **“Pride and Prejudice”**. It shows the firm believes as well as conformation for the certainty.

## 5. Conclusion

The results of the research shows that the significant discovery brings to light most possible themes and characters of Jane Austen's novel "Pride & Prejudice", except for those themes which are based on overall idea not on single word. Word clouds are really formed on the basis of statistics. Cirrus is therefore helpful in the extract of defined key characters and themes, such as dialogic theme, praising theme, Antithetical Binaries, theme of marriage, theme of knowledge, Theme of time, theme of commitment, theme of friendship, theme of argument, theme of certainty, two inches of ivory, theme of displacement in time and place, emotions / affection and the theme of conscious of limitations. This word cloud/Cirrus, on the other hand, facilitates readers in extracting key ideas without having to read the entire work. Word clouds are often used to preview, extract keywords, analyze text content, evaluate, predict, vocabulary development, vocabulary teaching, website evaluation, review websites, analytical languages, summaries results, bias analysis and author's tendencies. However, there is a restriction in that the word clouds do not show several word phrases at the same time. Each hyphenated segment of a word is treated as a separate word. In future research projects, related word clouds and semantic clouds can be searched in the same way. The results obtained may be applied for real-time language and literature teaching, or the same word clouds may be used to preview, key word extraction, comparison, vocabulary building, prediction, website evaluation, vocabulary teaching, speech analysis, exam revision, summary output, inclination of an author and bias analysis. The current study is interdisciplinary combining the domains of Literature, Linguistics, Education and Computer Science.

## References

- Brown, T. (2013). Yeats and the colours of poetry. *Yeats Annual No. 18*, 57-68. doi:10.11647/obp.0028.04
- Burrows, J. (2002). 'Delta': A measure of stylistic difference and a guide to likely authorship. *Literary and Linguistic Computing*, 17(3), 267-287. doi:10.1093/lc/17.3.267
- Cabena, P., Hadjinian, P., Stadler, R., Verhees, J., & Zanasi, A. (1998). *Discovering Data Mining: From Concept to Implementation*. Upper Saddle River, NJ: Prentice Hall.
- Fayyad, U. M., Shapiro, G. P., Smyth, P., & Uthurusamy, R. (Eds.). (1996). *Advances in knowledge discovery and data mining*. Menlo Park, Canada: AAAI Press.
- Harris, J., Mishra, P., & Koehler, M. (2009). Teachers' technological pedagogical content knowledge and learning activity types. *Journal of Research on Technology in Education*, 41(4), 393-416. doi:10.1080/15391523.2009.10782536
- Javed, S., Javed, R., Ahmed, N., & Anjum, D. (2019). Human resource management practices and its impact on job satisfaction among employees in higher education sector. *International Journal of Marketing and Human Resource Management*, 10(2), 1-12.
- Masood, M. H., Shafi, S., Yousaf Rahim, M., and Darwesh, M. A. (2020a). Interference of L1 (Urdu) in L2 (English) in Pakistan: Teaching English as a second language. *International Journal of Applied Linguistics and English Literature*, 9(5): 110-118. <https://doi.org/10.7575/aiac.ijalel.v.9n.5p.110>
- Masood, M. H., and Shafi, S. (2020c). Exploring Marxist perspective amidst exploitation and false consciousness in Hosain's the old man. *International Journal of Applied Linguistics and English Literature*, 9(3): 18-24. <https://doi.org/10.7575/aiac.ijalel.v.9n.3p.18>
- Masood, M. H., Shafi, S. C., Shah, A. A., Kamran, M., Yousaf, M., and Saleem, K. (2020d). Governance Reforms under the Justice and Development Party in Turkey as Model for Pakistan. *Elementary Education Online*, 9(3): 2701-2712. <https://doi.org/10.17051/ilkonline.2020.03.735429>
- Masood, M. H., Shafi, S., Arif, I. M., Shah, A. A., Kamran, M., & Adeel, M. (2021 e). Psychological Implications of COVID-19 Epidemic on the University Students. *Linguistica Antverpiensia*, (3), 4688-4705.

- McNaught, C., & Lam, P. (2010). Using Wordle as a supplementary research tool. *The Qualitative Report* Volume, 15(3), 630-643.
- McNaught, C., and Lam, P. 2014. Using Wordle as a supplementary research tool. *The Qualitative Report*. doi:10.46743/2160-3715/2010.1167
- Millen, et al, P. (2004). Irwin, A., J. Millen, et al., global aids: Myths and facts. Tools for fighting the aids pandemic. *Bulletin Amades*, (60). doi:10.4000/amades.559
- Nurmela, A. (2021). Good morning! Good day! Good afternoon! Good evening! Good night! doi:10.22501/rc.1166516
- Ramsden, A. and Bate, A., (2008). Using word clouds in teaching and learning. *University of Bath*. Retrieved December, 18, p.2009.
- Siddiq, M., Arif, I. M. Q., Shafi, S. C., and Masood, M. H. (2021b). *A survey research analysis of effectiveness of vocabulary learning through English vocabulary corpus*. In *2nd International Conference on Education, Social Science, Supply Chain, Engineering, Technology and Tourism (ESSET2021)* (pp. 8-19). Confbay, Malaysia.
- Sinclair, S., & Rockwell, G. (2015). Text analysis and visualization. *A New Companion to Digital Humanities*, 274-290. doi:10.1002/9781118680605.ch19
- Sinclair, S., & Rockwell, G. (2015, May). *Principles of Voyant Tools*. .
- Sinclair, S., & Rockwell, G. (2015). Text analysis and visualization. *A New Companion to Digital Humanities*, 274-290. doi:10.1002/9781118680605.ch19
- Ullah, Z., Arif, I. M., and Qaisar, R. (2020). *Comparative analysis of productivity apps on time management: A survey based study*. In *National Conference on Education (NCE-2020)* (p. 49). National University of Modern Languages (NUML), H-9 Islamabad.
- Ullah, Z., Uzair, M., and Mahmood, A. (2019). Extraction of Key Motifs as a Preview from 2017 Nobel Prize Winning Novel, ‘Never Let Me Go’: An Interactive Word Cloud Study. *Journal of Research in Social Sciences (JRSS)*, 7(2): 83-98.
- Ullah, Z., Uzair, M., and Mahmood, A. (2019). Extraction of Key Motifs as a Preview from 2017 Nobel Prize Winning Novel, ‘Never Let Me Go’: An Interactive Word Cloud Study. *Journal of Research in Social Sciences (JRSS)*, 7(2): 83-98.
- Ullah, Z., Uzair, M., and Mahmood, A. (2019). Extraction of Key Motifs as a Preview from 2017 Nobel Prize Winning Novel, ‘Never Let Me Go’: An Interactive Word Cloud Study. *Journal of Research in Social Sciences (JRSS)*, 7(2): 83-98