Volume 1 Issue 4 (August,2024)
Jurnal of Pedagogi : Jurnal Pendidikan
ISSN: : 3046-9554 (Online)

Lexical Features in the TED Talks "Future Education" : A Corpus-Based Approach

Tutut Indah Widyawati[1]✉, Dita Farisa Setyo Budhi[2], Irma Khoirot Daulay[3], Toyyibah[4]
[1,2,3,4] English Education Study Program, State Islamic Institution of Kediri

Abstract
This study analyzed Yılmaz Köylü's TED Talk on future education using a corpus-based approach to identify key lexical features and provide insights into its linguistic structure. The analysis involved transcribing the TED Talk and examining various linguistic metrics, including word frequency, document length, vocabulary density, readability, and collocations using Voyant Tools. The results indicated that the talk contains 2,740 words, with 706 unique forms, demonstrating a rich and varied vocabulary. Key themes such as education, technology, skills, creativity, and innovation were prominent, emphasizing their interconnected roles in shaping the future of education. The readability index corresponded to a 10th-grade level, making the content accessible to a wide audience. Additionally, the analysis revealed a high average number of words per sentence, indicating the use of complex sentence structures. Recommendations for improving readability included simplifying sentences by breaking longer ones into shorter, more concise statements. The study underscores the need to adapt education systems to meet the evolving demands of a rapidly changing world, with technology and creativity playing central roles.
Keywords: *Analysis, Corpus-Based Approach, Future Education, Lexical Features, TED Talk,*

✉ Corresponding author :
Email Address : tiwwidy@gmail.com
Received July 06, 2024, Accepted August 22, 2024, Published August 27, 2024

Introduction
In today's fast-changing world, education practices in different countries are evolving. This includes looking at new ways of teaching and learning that are emerging globally (Slattery, 2024). With new technologies and global challenges, it's crucial to prepare students for an uncertain and complex future (Gobara & Ahmed, 2024). The TED Talk "Future Education" offers an insightful look into how education might evolve to meet these demands. t highlights the importance of integrating technology, creativity, and interdisciplinary learning into modern education systems. The talk also discusses the role of educators in fostering skills that will help students succeed in an uncertain future. As global challenges continue to shift, education must evolve to not only impart knowledge but also develop the adaptive and innovative capacities students need to thrive in the 21st century.

Technology, Entertainment, Design (TED) Talks have emerged as an influential platform for people to communicate their thoughts, experiences, and knowledge to a large audience worldwide (Flores et al., 2024). They are not only engaging but also rich in content, making them excellent subjects for linguistic analysis. According to the Ted website, TEDx Talks are defined as short presentations where speakers share new and surprising ideas or offer fresh perspectives on familiar topics. These talks

DOI: https://doi.org/10.62872/k3d5gd27

last under 18 minutes to keep the audience focused and engaged. They cover a wide range of topics, from groundbreaking ideas and technological innovations to performances, artistic statements, scientific wonders, engaging insights, and discussions on important social issues. TEDx, founded by publishing entrepreneur Chris Anderson (Nuraniwati & Permatasari, 2022), aims to inspire and inform by showcasing diverse voices and thought-provoking content in a compact and accessible format. Beyond their original purpose, TED Talks have become extremely valuable for education. Analyzing TED Talks can help researchers in discourse studies understand patterns of communication, rhetorical strategies, and the impact of language in public speaking contexts.

Analyzing TED Talks not only provides insights into effective public speaking but also highlights the significant role of technology in shaping modern educational practices. Over the last decade, technology, especially artificial intelligence (AI), has significantly transformed education. Tools like OpenAI's ChatGPT, capable of generating human-like text and facilitating automated conversations, have become popular, offering numerous applications in the educational field (Grassini, 2023). This technological shift emphasizes the need for innovative educational practices that foster collaboration, creativity, and critical thinking. Hargreaves and Shirley (2009) highlight the importance of teacher professional development and supportive learning environments to better prepare students for future challenges.

The integration of technology in education has been a major focus of recent research, with numerous studies highlighting its potential to enhance learning outcomes. Prensky (2001) introduced the concepts of "digital natives" and "digital immigrants," urging educators to adapt their teaching methods to suit tech-savvy students. He argues that technology can facilitate personalized learning, promote student engagement, and provide access to a wealth of information and resources. Despite several digitization initiatives examined in various countries (Masters, 2018; Genlott et al., 2019; Wiklund & Andersson, 2018), more evidence is needed to understand the complexities of technological innovation in education (Howard et al., 2019).

Creative thinking is essential for 21st-century skills, enabling students to solve problems and innovate (Abdulla et al., 2023). A curriculum that enhances creative thinking prepares students for future challenges (Wahono et al., 2020). By fostering creativity, educators empower students to be active learners and innovative thinkers, equipping them with tools to navigate the complexities of the modern world (Beghetto, 2022). In discourse analysis, corpus-based approaches have gained popularity for systematically analyzing large text collections (corpora) to identify language patterns. This method provides empirical evidence and insights into language use in educational contexts (McEnery & Hardie, 2012; Baker, 2006). Voyant Tools, a web-based text analysis platform, is widely used in education and research for its accessibility and extensive analytical capabilities (Sinclair & Rokwell, 2015). It offers features like Cirrus (word clouds), Reader (text display with word frequency), Trends (word usage analysis), Summary (basic text statistics), and Context (specific text instances for word usage). Voyant Tools supports flexible, detailed text analysis and visualization, aiding both novice and experienced researchers (Welsh, 2014; Uboldi & Caviglia, 2015).

This study builds upon previous research by Parawee Khajornphaiboon and Sompatu Vungthong (2023), which investigated the rhetorical move structure and linguistic features in the introduction part of TED Talks using a corpus-based analysis of discourse organization. Additionally, it draws from the study by Nuraniwati and Permatasari (2022), which examined the most common hedges used in popular TED Talk monologues and the various communicative strategies they denote using a corpus-based pragmatic study.

The main goal of this study is to explore lexical features in Yılmaz Köylü's TED Talk on future education. Using a corpus-based approach means that the researchers will collect and examine a large amount of text from Köylü's TED Talk. A corpus-based approach is a method used in linguistics that involves the analysis of language data collected in a corpus (Flowerdew, 2013). Using Voyant Tools, https://voyant-tools.org/, this study focuses on analyzing summary tools that consists of word frequency, document length, vocabulary density, and uniqueness; trends, keywords in context, and collocations. By examining these lexical features will help to clarify Köylü's perspective on the future of education.

Method

This study employs a corpus-based approach to analyze the lexical features present in TED Talk titled "Future Education." The analysis primarily utilizes Voyant Tools, a web-based platform designed

DOI: https://doi.org/10.62872/k3d5gd27

for text analysis that offers a range of analytical functions to explore and visualize textual data. Voyant Tools is accessible online without the need for registration and provides advanced statistical tools, making it a cost-effective solution for qualitative data analysis (Hetenyi et al., 2019).

The corpus used in this study was created by transcribing TED Talk "Future Education" with careful attention to ensuring accuracy and completeness. Subsequently, the transcribed text was uploaded to Voyant Tools for comprehensive analysis. Voyant Tools facilitates analysis through five main tools: Cirrus, which generates word clouds to visualize word frequency; Reader, for reading and displaying word lists; Trends, which identifies changes in word usage throughout the text; Summary, providing basic statistical information about the text; and Keywords in Context, allowing for detailed examination of how specific words are used within the text. By utilizing these tools, this study aims to uncover and interpret key lexical features discussed in Köylü's TED Talk, contributing insights to the discourse on future education.

Result and Discussion

1. Summary Tools

Summary examines all texts by analyzing word frequency, document length, vocabulary density, and uniqueness (Alhudithi, 2021). The analysis shows that the talk contains a total of 2,740 words with every occurrence like multiple “the" is counted. Within these words, there are 706 unique forms, with multiple occurrences of words like “the” being counted once, showcasing a wide range of vocabulary used throughout the talk. Unique word forms refer to the total number of distinct words in a text, counting different forms or variations of the same word as separate entries (Kushnir et al., 2018). This diversity suggests that Köylü employs various words and expressions to convey his ideas, making the talk rich in language and potentially engaging for the audience.

Vocabulary density is a measure of how many different words are used compared to the total number of words (Kremmel et al., 2023). In this case, the density of 0.258 means that about a quarter of the words used in the talk are unique. This shows that the speaker uses a good variety of words, which is common in talks meant for a general audience. It helps make the ideas in the talk more interesting and easier to understand.

The readability index, with a score of 10.868, indicates how easy or difficult a text is to read. According to Flesch–Kincaid’s reading ease scores, a lower score means the text is easier to understand for students in lower grades, while a higher score means it's more suitable for higher grades or college (Lipovetsky, 2023). Therefore, with a score corresponding to a 10th-grade reading level, the talk is designed to be understandable by a broad audience. It achieves this by balancing the use of complex words with overall readability, ensuring audience engagement.

The average number of words per sentence in the analysis is 2740.0, which is unusually high. This suggests there might be a problem with how the sentences were divided during the analysis. In spoken language, sentences usually have fewer words. It's important to be cautious when interpreting this value, as it likely stems from a technical error in how the text was processed.

2. Trends and Frequency of Words

In this section results of Voyant Tools show the relative frequencies of selected terms across ten segments of the TED Talk "Future Education". The x-axis represents the document segments (1 to 10), while the y-axis indicates the relative frequencies of the terms. The terms analyzed are "students" (purple), "student" (pink), "right" (green), "language" (blue), and "it's" (light green). The trends depicted by the lines illustrate how these terms are distributed throughout the talk, highlighting areas of focus and thematic shifts.

DOI: https://doi.org/10.62872/k3d5gd27

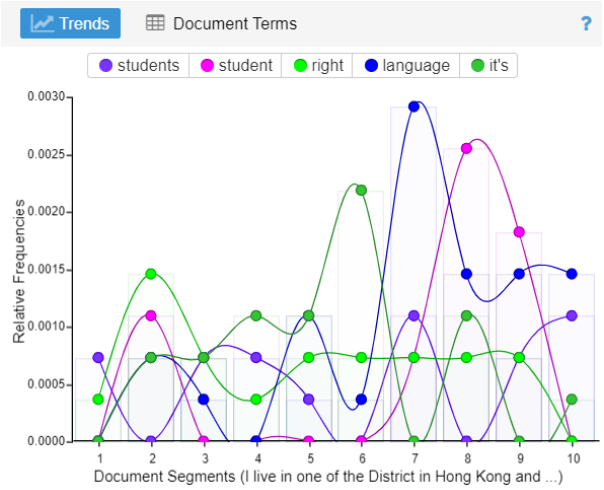

Figure 1. Term Frequencies Chart of specific lexical terms

The graph presented in this analysis showcases the relative frequencies of specific lexical terms across ten document segments from the TED Talk "Future Education". The terms analyzed include "students," "student," "right," "language," and "it's," represented by different colored lines.

The findings reveal distinct patterns in the usage of these terms throughout the talk. For instance, the term "students" (purple) shows sporadic usage with peaks in segments 4, 8, and 10, indicating points where the discussion might focus more broadly on students as a group. In contrast, the term "student" (pink) peaks significantly in segments 7 and 9, suggesting individual student references are more concentrated in these sections.

The term "right" (green) shows varying usage with notable peaks in segments 5 and 8, implying critical points where rights are emphasized. The term "language" (blue) exhibits the highest peak in segment 7, indicating a focused discussion on language during this part of the talk. Lastly, "it's" (light green) displays frequent usage throughout, with peaks in segments 5, 7, and 9, which could indicate its use in explanations or descriptions.

These lexical trends are illustrating how specific topics and terms are distributed and highlighted throughout the presentation within the TED Talk (Dang & Webb, 2014).

3. Words Clouds

3.1. Cirrus

The Cirrus tool creates a word cloud that displays the most frequently used words in a corpus or document. The word cloud in Figure 2 visually represents the most frequently occurring terms in the TED Talk "Future Education". The size of each word correlates with its frequency in the text, with larger words appearing more often. Key terms such as "language," "students," "it's," "right," and "student" are prominently featured, indicating their significance in the talk.

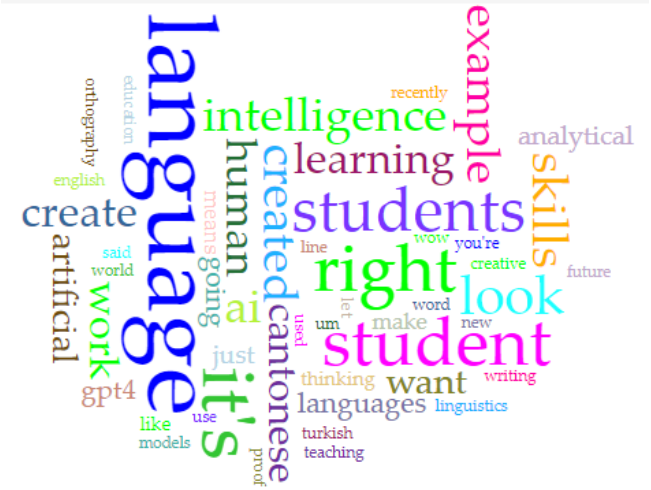

Figure 2. Word Clouds for most frequent words

DOI: https://doi.org/10.62872/k3d5gd27

"Language" is the most dominant term, suggesting that discussions around language play a central role in the presentation. Other notable terms include "intelligence," "learning," "skills," "create," and "artificial," which reflect key themes related to education, technology, and cognitive development (Compagnone, 2015). This visualization complements the trend analysis by providing a holistic view of the lexical focus areas in the TED Talk, highlighting the emphasis on language and education-related terms.

3.2. Terms

Terms identify all words that are exclusive to a specific text. In the analysis of the TED Talk Future Education, the term "language" appeared most frequently, with 27 occurrences, indicating a significant focus on linguistic aspects in the context of future education. This aligns with the increasing importance of language skills in a globalized world, where understanding the different ways people from various cultures interact is pivotal for cross-cultural communication (Ahtif & Gandhi, 2022).

The terms "it's" and "right" appeared 20 and 18 times, respectively. The frequent use of "it's" indicates a conversational tone, typical of TED Talks which aim to engage and connect with the audience. The prominence of "student" (17 occurrences) and "students" (15 occurrences) reflects an educational paradigm that is learner-centered (Hoque, 2021). This is consistent with modern educational theories that prioritize student-centered learning and active engagement. "Skills" appeared 13 times, highlighting the emphasis on developing competencies beyond traditional academic knowledge. "Look" also appeared 13 times, potentially indicating the speaker's effort to draw attention to specific points or to engage visually with the audience. The term "intelligence" appeared 12 times, emphasizing the importance of intellectual development in future education.

Other notable terms include "created" and "ai," each with 12 occurrences, pointing to the role of innovation, creativity, and artificial intelligence in education. This suggests a trend where future education aims to foster creativity and technological fluency.

3.3. Links

Links show how high-frequency words are connected using a dynamic network graph. This graph helps visualize the relationships between these common words, making it easier to see how they interact and relate to one another (Alhudithi, 2021). In this study, the links are analyzed using Voyant Tools, and the results are shown in the graph below. The term "language" is central in the network, connected to several other terms including "it's," "word," and "right." This centrality suggests a significant emphasis on language and communication throughout the talk. The frequent use of "it's" and its connections to terms such as "right," "ability," and "just" further underscore the conversational tone of the talk, typical of TED Talks which aim to engage the audience effectively.

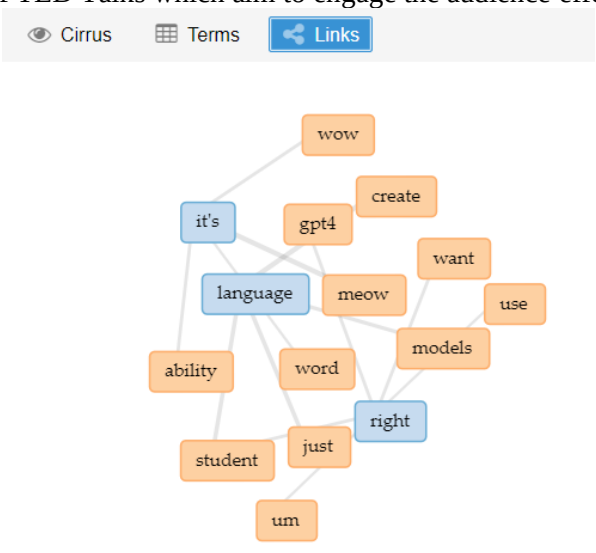

Figure 3. Words Links

The prominence of "language" and its connections highlight the importance of effective communication in future education, aligning with the need for strong language skills in a globalized world (Gems, 2019). The conversational style, indicated by the frequent use of "it's" and related terms, suggests an effort to make complex ideas more relatable and accessible. The term "student," connected to "ability" and "language," indicates a focus on the learner's abilities and linguistic skills, reflecting a

DOI: https://doi.org/10.62872/k3d5gd27

modern educational paradigm that prioritizes student-centered learning and the development of practical skills.

Moreover, terms like "create," "gpt4," "meow," and "models" point to themes of innovation and the use of advanced technologies such as AI in education. This suggests that future education is expected to integrate creative and technological aspects to enhance learning experiences (Li et al., 2022). The emphasis on language and communication skills indicates that future education systems will need to prioritize these areas to prepare students for global interactions. The focus on student abilities and practical skills development suggests a move towards more personalized and skill-oriented approaches. The integration of creativity and advanced technologies highlights the need for education systems to adopt innovative tools and methods to keep pace with technological advancements (OECD, 2018).

Keywords in Context (KWIC)

3.4. Context

Keywords in Contexts display lines of text that show how frequent words are used in sentences. This helps understand the context in which these common words appear by showing the words and phrases around them (Alhudithi, 2021). In these results of KWIC for the Future Education Ted Talk, the analysis focuses on the term "I live in." This analysis reveals diverse usages and themes within the corpus. Some of results of keywords in context are shown in the table below.

Table 1. Context Analysis Table

Context (Left)	Phrase	Context (Right)
just walk there nevertheless these	I live in…	models can do amazing and
how GPT-4 and other large	I live in…	models can be used there
because GPT-4 and other large	I live in…	models can be used in
conditions now we have large	I live in…	models and artificial intelligence
replicated by artificial intelligence	I live in…	be Turkish or another language
time while you're learning a	I live in…	of course you'll be more
language be Turkish or another	I live in…	from scratch students were really
to have you create a	I live in…	from scratch they're like how
the idea of creating a	I live in…	you are crazy they said
you're supposed to create a	I live in…	an alien language for this
create a language an alien	I live in…	for this movie just like
movie just like the navi	I live in…	in Avatar or Klingon in
in Star Trek or Elvish	I live in…	in um Lord of the
an alphabet they create a	I live in…	and they named it eagle
yet another student created a	I live in…	and they called it quat
a writing system for their	I live in…	and this is what they

The table breaks down how the phrase "I live in" is used in different parts of the document, showing key themes and examples. It highlights how advanced AI models like GPT-4 can transform education, especially in learning languages. By focusing on creativity, students are encouraged to create new languages inspired by popular media like "Avatar," "Star Trek," and "Lord of the Rings," integrating cultural references into their learning experiences. The document also looks at how these creative efforts include making new alphabets and writing systems, as well as naming and giving symbols to these language creations. The table shows a clear story of using AI to encourage learning by creating new languages in fun ways (Iftanti et al., 2023). It connects school subjects with popular culture to engage and inspire students effectively.

3.5. Bubblelines

Bubblelines visualizes different levels of word frequency by showing animated bubbles that vary in size and color. The bubbles represent how often words appear, with larger and differently colored bubbles indicating higher or lower frequencies. This makes it easy to see and compare how frequently different words are used in a visually engaging way (Alhudithi, 2021).

DOI: https://doi.org/10.62872/k3d5gd27

Figures 4. bubblelines for word frequency

The Bubblelines visualization from Voyant Tools shows the distribution and frequency of the terms "language," "it's," "right," "student," and "students" across the corpus. Each term is represented by a different color, with the circle size indicating frequency. "Language" appears sporadically (purple), "it's" (green) clusters in certain sections suggesting informal or conversational parts, and "right" (blue) appears frequently, indicating centrality in the discourse. The term "student" (pink) has significant occurrences in specific sections, while "students" (light blue) appears consistently, highlighting discussions about multiple students. Notable clusters of pink and light blue suggest concentrated discussions on students, while green clusters indicate informal sections of the text.

3.6. Collocations

Collocates creates a list showing which words often appear together, revealing connections and associations between them (Alhudithi, 2021). The table The Collocates visualization in Voyant Tools shows the term, its collocate, and the count of occurrences within a specific context. This helps identify words that frequently occur together, providing insights into common phrases or associations in the text. The summary table is shown below.

Table 2. Collocates Summary

Term	Collocates	Count
student	created	7
	proof	5
	models	4
	came, meow, told, said	2
	know, able, required	1
language	we're, learning	2
it's	work, wow, kind, japanese	1
right	intelligence	2
students	create, walking	2
skills	look, cross, tools	1
intelligence	right	2

The word 'student' is often discussed in terms of creating something, providing proof, and modeling. It also associated with various actions like "came," "told," "said," and the act of creation. The next is the word 'language' that is frequently discussed in relation to "we're" and "learning," indicating discussions about language learning experiences. The word 'it's' is used in diverse contexts such as "work," "wow," "kind," "Japanese," and "finding," suggesting its use in expressing work-related information or exclamatory remarks. The word Right is discussed in relation to "intelligence," indicating discussions about correctness or appropriateness in the context of intelligence.

The plural word for student (students) is associated with actions like "create" and "walking," and qualities such as "know," "able," and "required," pointing to various attributes and actions related to multiple students. For 'skills' is associated with "look," "cross," and "tools," indicating discussions about different types of skills and the tools or actions associated with them. And for the word intelligence is discussed in relation to "right," indicating discussions about correctness or suitability in the context of intelligence.

The Collocates visualization reveals important themes and contexts within the text (Brezina et al., 2015). The words "student" and "students" are frequently mentioned, often in relation to creating things, providing proof, and engaging in different activities. Discussions about "language" are commonly linked to learning. The contraction "it's" is used in various contexts, showing its versatility in the text. The terms "right" and "intelligence" often appear together, suggesting that the text discusses what is correct or appropriate, especially in the context of intelligence.

DOI: https://doi.org/10.62872/k3d5gd27

Conclusion

The corpus-based analysis of Yılmaz Köylü's TED Talk "Future Education" reveals a comprehensive exploration of evolving educational paradigms amidst technological advancements and global challenges. With 2,740 words and 706 unique forms, Köylü employs a diverse vocabulary, emphasizing accessibility with a readability index suited for a broad audience. Voyant Tools highlighted thematic shifts, showing peaks in terms like "students," "language," and "intelligence," underscoring discussions on personalized learning, technological integration, and critical thinking skills. The prominence of "language" in word clouds and collocations signifies its pivotal role, reflecting a focus on communication and cultural understanding. Insights from Keywords in Context analysis deepen understanding of contextual usage, revealing nuanced interpretations of key terms throughout the talk. This study contributes valuable perspectives on future education, emphasizing the need for adaptive educational strategies that foster creativity and technological fluency to prepare students for a complex, interconnected world.

References

Abdulla Alabbasi, A. M., Reiter-Palmon, R., & Acar, S. (2023). Problem finding and divergent thinking: A multivariate meta-analysis. *Psychology of Aesthetics, Creativity, and the Arts*. https://doi.org/10.1037/aca0000640

Agelli Genlott, A., Grönlund, Å, & Viberg, O. (2019). Disseminating digital innovation in school: Leading second-order education change. *Education and Information Technologies, 24(5)*, 3021–3039. https://doi.org/10.1007/s10639-019-09908-0

Ahtif, M. H., & Gandhi, N. (2022). The role of language in cross cultural bonds. *Journal of Asian Multicultural Research for Social Sciences Study, 3(4)*, 7–16. https://doi.org/10.47616/jamrsss.v3i4.321

Alhudithi, E. (2021). Review of Voyant Tools: See through your text. *LLT: Language Learning & Technology, 25(3)*, 43–50. http://hdl.handle.net/10125/73446

Baker, P. (2023). *Using corpora in discourse analysis*. Bloomsbury Publishing.

Beghetto, R. A., & Anderson, R. C. (2022). Positive creativity is principled creativity. *Education Sciences, 12(3)*, 184. https://doi.org/10.3390/educsci12030184

Bradley, J. (2019). Digital tools in the humanities: Some fundamental provocations?. *Digital Scholarship in the Humanities, 34(1)*, 13-20. https://doi.org/10.1093/llc/fqy033

Brezina, V., McEnery, T., & Watham, C. (2015). Collocations in Context: A new perspective on collocation networks. *International Journal of Corpus Linguistics, 20(2)*. https://ling.hse.ru/data/2016/10/11/1108830056/brezina_et_al_2015_-_graphcoll_paper.pdf

Clouder, L., & King, V. (2015). What works? A critique of appreciative inquiry as a research methodology. *In Theory and method in higher education research, 1*, 169-190. Emerald Group Publishing Limited. http://dx.doi.org/10.1108/S2056-375220150000001008

Compagnone, A. (2015). The reconceptualization of academic discourse as a professional practice in the digital age: A critical genre analysis of TED Talks. *HERMES - Journal of Language and Communication in Business, 27(54)*, 49-69. https://doi.org/10.7146/hjlcb.v27i54.22947

Dang, T. N. Y., & Webb, S. (2014). The lexical profile of academic spoken English. *English for Specific Purposes, 33(1)*, 66-76. https://doi.org/10.1016/j.esp.2013.08.001

Flowerdew, J. (2013). *Discourse in English Language Education (1st Edition).* New York: Routledge.

Flores, J. L., Kilag, O. K., Tiu, J., Groenewald, E., Balicoco, R., & Rabi, J. I. I. (2024, May 19). TED Talks as Pedagogical tools: Fostering Effective oral communication and Lexical Mastery. https://risejournals.org/index.php/imjrise/article/view/410

Gems. (2019, June 24). *The importance of language in global education.* World of Education. https://worldofeducationmag.com/2019/03/26/the-importance-of-language-in-global-education/

Gobara, R. E. G. E., & Ahmed, Z. E. (2024). Preparing students for an AI-Enhanced future. In Advances in educational technologies and instructional design book series (pp. 286–304). https://doi.org/10.4018/979-8-3693-2728-9.ch013

DOI: https://doi.org/10.62872/k3d5gd27

Grassini, S. (2023). Shaping the Future of Education: Exploring the potential and consequences of AI and ChatGPT in educational settings. *Education Sciences, 13 (7),* 692. https://doi.org/10.3390/educsci13070692

Hargreaves, A. P., & Shirley, D. L. (Eds.). (2009). *The fourth way: The inspiring future for educational change*. Corwin Press.

Hetenyi, G., Lengyel, A. D., & Szilasi, M. D. (2019). Quantitative analysis of qualitative data: Using voyant tools to investigate the sales-marketing interface. *Journal of Industrial Engineering and Management, 12(3),* 393. https://doi.org/10.3926/jiem.2929

Hoque, M. E. (2021). The Learner-centered Paradigm of Education: Turning the Classroom into a Community. *The EDRC Journal of Learning and Teaching – EJLT, 7(2).* https://www.researchgate.net/publication/353342461

Howard, S., Thompson, K., Yang, J., & Ma, J. (2019). Working the system: Development of a system model of technology integration to inform learning task design. *British Journal of Educational Technology, 50(1),* 326–341. https://doi.org/10.1111/bjet.12560

Iftanti, E., Awalin, A. S., & Izza, F. N. (2023, October 24). The use of artificial intelligence as the potential supporting learning tools for doing learning projects. https://jurnalfaktarbiyah.iainkediri.ac.id/index.php/proceedings/article/view/1808

Khajornphaiboon, P., & Vungthong, S. (2019). Analyzing the introduction of TED Talks: A corpus–based analysis of discourse organization. https://ejournals.swu.ac.th/index.php/hm/article/view/11899/9903

Kremmel, B., Indrarathne, B., Kormos, J., & Suzuki, S. (2023). Unknown Vocabulary Density and Reading Comprehension: Replicating Hu and Nation (2000). *Language Learning, 73(4),* 1127–1163. https://doi.org/10.1111/lang.12622

Kushnir, O., Yaremkiv, V., Dovhan, I., & Kashuba, A. (2018). Influence of Unique Words on the Performance of Corpus-Based Keyword Detection Methods. *International Scientific and Practical Conference "Electronics and Information Technologies" (ELIT-2018).* https://doi.org/10.30970/elit2018.a22

Lipovetsky, S. (2023). Readability indices structure and optimal features. *Axioms, 12(5),* 421. https://doi.org/10.3390/axioms12050421

Luna Scott, C. (2015). *The Futures of Learning 3: What kind of pedagogies for the 21st century?*

Masters, J. (2018). Trends in the digitalization of K-12 schools: The Australian perspective. *Seminar.Net, 14(2),* 120–131. https://journals.hioa.no/index.php/seminar/article/view/2975

Miller, A. (2018). Text mining digital humanities projects: Assessing content analysis capabilities of voyant tools. *Journal of Web Librarianship, 12(3),* 169-197. http://dx.doi.org/10.1080/19322909.2018.1479673

Nuraniwati, T., & Permatasari, A. N. (2022). Hedging in TED Talks: A Corpus-Based Pragmatic Study. *JEELS (Journal of English Education and Linguistics Studies, 8(2),* 203–226. https://doi.org/10.30762/jeels.v8i2.2969

OECD. (2018). The future of education and skills Education 2030. *OECD: Organisation for Economic Co-operation and Development.* https://www.oecd.org/education/2030-project/contact/E2030_Position_Paper_(05.04.2018).pdf

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon, 9(5),* 1-6.

Sinclair, S., & Rockwell, G. (2015). Text Analysis and Visualization. *Wiley Online Library*, 274–290. https://doi.org/10.1002/9781118680605.ch19

Slattery, M. (2024). Education strategy in a changing society. https://doi.org/10.4324/9781003358770

Steiner, C. M., Agosti, M., Sweetnam, M. S., Hillemann, E. C., Orio, N., Ponchia, C., ... & Conlan, O. (2014). Evaluating a digital humanities research environment: the CULTURA approach. *International Journal on Digital Libraries, 15*, 53-70. https://doi.org/10.1007/s00799-014-0127

Sula, C. A. (2016). Digital Humanities and Libraries: A Conceptual Model. *Journal of Library Administration, 56(1), 10–26.* https://doi.org/10.1080/01930826.2015.1105545

Underwood, T. (2019). Distant Horizons: Digital Evidence and Literary Change. *University of Chicago Press.*

Uboldi, G., & Caviglia, G. (2015). Information visualizations and interfaces in the humanities. *In Springer eBooks*, 207-218. https://doi.org/10.1007/978-1-4471-6596-5_11

DOI: https://doi.org/10.62872/k3d5gd27

Wahono, B., Lin, P. L., & Chang, C. Y. (2020). Evidence of STEM enactment effectiveness in Asian student learning outcomes. *IJ STEM Ed 7, 36.* https://doi.org/10.1186/s40594-020-00236-1

Welsh, M. E. (2014). Review of Voyant tools. *Collaborative Librarianship, 6(2),* 96-98. https://digitalcommons.du.edu/collaborativelibrarianship/vol6/iss2/8

Williams, N. L., Inversini, A., Buhalis, D., & Ferdinand, N. (2015). Community crosstalk: an exploratory analysis of destination and festival eWOM on Twitter. *Journal of Marketing Management, 31(9-10),* 1113-1140.

Wiklund, M., & Andersson, A. (2018). Student-initiated use of technology: Friend and foe. *E-Learning and Digital Media, 15(1),* 3–16. https://doi.org/10.1177/2042753017752767

Wilkinson, L., & Friendly, M. (2009). The History of the Cluster Heat Map. *The American Statistician, 63(2),* 179-184. https://doi.org/10.1198/tas.2009.0033

Wiklund, M., & Andersson, A. (2018). Student-initiated use of technology: Friend and foe. *E-Learning and Digital Media, 15(1),* 3–16. https://doi.org/10.1177/2042753017752767

Wilkinson, L., & Friendly, M. (2009). The History of the Cluster Heat Map. *The American Statistician, 63(2),* 179-184. https://doi.org/10.1198/tas.2009.0033