

INFORMATION SEARCH COMPETENCIES AND QUALITY OF RESEARCH WRITING AMONG VOCATIONAL AND TECHNICAL EDUCATION GRADUATING STUDENTS IN THE UNIVERSITY OF CROSS RIVER STATE (UNICROSS)

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Abstract

The study determined the influence of information search competencies on quality of research writing among vocational and technical education graduating students in the University of Cross River State (UNICROSS). To achieve the purpose, two research questions were asked and two null hypotheses were formulated. The study adopted a predictive correlation research design. Purposive sampling technique and census approach were used to select 226 vocational and technical education graduating students comprising 35 and 191 graduating (Year 4) students in Technical and Business Education in the University of Cross River State in the 2023/2024 academic sessions. A validated questionnaire titled “Information Search Competencies and Quality of Research Writing Questionnaire” (ISCQRWQ) was the instrument used for data collection. The questionnaire was validated by three experts. A reliability index of 0.82 was obtained for the questionnaire using Cronbach Alpha reliability coefficient after a pilot test. 218 copies of the questionnaire were successfully retrieved after distribution. Research questions were answered and hypotheses were tested using simple linear regression analysis at .05 significance level. From the answers to the research questions, use of relevant search engines and application of correct search terms influence quality of research writing among vocational and technical education graduating students in the University of Cross River State. Test of hypotheses revealed that use of relevant search engines and application of correct search terms significantly influence quality of research writing among vocational and technical education graduating students in the UNICROSS. Based on the findings, it was recommended amongst others that students should be taught the various practical competencies in accessing relevant information online using Boolean operators, keywords, asterisks and truncation; as this would help reduce information overload

Keywords: Competencies, Information, Research, Quality, Writing,

Introduction

Vocational and Technical Education (VTE) programs are intended to provide students with practical skills and technical competence for industries such as engineering, agriculture, and technology, while also emphasizing research that combines academic rigor with practical application. *Vocational and Technical Education (VTE) aims to equip students with practical skills for employability, and digital literacy is essential for all students (Abeng&Ukah, 2025).*

At the University of Cross River State (UNICROSS), formerly Cross River University of Technology, VTE graduates work on capstone research projects that require creativity, methodological rigor, precise citations, and practical relevance, all of which contribute to research quality. According to Ocheet *et al.*, (2021), 21st-century education has expanded beyond the classroom; with the advent of the World Wide Web, various social learning environments and educational technologies have emerged online, making them easily accessible to both teachers and students. Similarly, Okaka and Abeng (2025) believe that technology has been widely used to facilitate teaching and learning activities. The emergence of it also motivates educators, teachers, and education practitioners to use it for a variety of instructional goals, including research.

Hence, Ayang (2025) defines research quality in VTE as complex, including originality (new contributions to technical disciplines), methodological rigor (sound study design and analysis), citation correctness (use of credible sources), and practical relevance (applicability to industrial needs). These measures are crucial for UNICROSS VTE students, whose projects frequently involve building technical solutions, such as agricultural breakthroughs or engineering prototypes, which necessitate both theoretical knowledge and practical results (Okon&Archibong, 2019). According to Abang and Abeng (2025), the quality of academic research is determined by identifying the problem (subject/issue), preparing research proposals, planning the research, conducting the research, writing and reporting the research, and discovered that students' ICT competencies in online information search play an important role in ensuring that research is properly conducted.

Information technology has revolutionized the quality of research writing by transforming how scholars collaborate, share knowledge, and engage with diverse audiences. According to Afebende (2019), digital technologies have changed not only the way information is packaged, processed, stored and disseminated but has also changed how users seek and access information. In this age of Information and Communication Technology (ICT), competencies in the use ICT are necessity (Abang & Abeng, 2025). According to Abeng *et al.*, (2017), a critical demand in the modern corporate landscape is the ability of employees to use computer programs, particularly online platforms, for diverse purposes. However, Asuo and Abeng (2025) believe that educators and learners fail to use these resources effectively for instruction and education, most likely due to a lack of competencies.

Information search competencies represent a cornerstone of modern academic research, particularly in fields like Vocational and Technical Education (VTE), where students must synthesize practical skills with evidence-based analysis to produce high-quality research writing (Gusenbauer, 2020). These competencies encompass the ability to navigate digital landscapes effectively, retrieve credible sources, and integrate them into coherent, original narratives that demonstrate technical proficiency and innovation. These competencies are not limited to: use of relevant search engines, web search competencies, application of correct search terms, narrowing search terms to specific subjects and defining a search strategy among others. At the University of Cross River State (UNICROSS), VTE

programs, situated within the Faculty of Education, prepare students for careers in technical trades such as engineering, agriculture, and vocational training, where research writing serves as a critical evaluation tool for capstone projects. Hence, the study focused on two of these information search competencies: use of relevant search engines and application of correct search terms.

Sergey and Lawrence (2016) defined search engines as programs that search documents for specified keywords and returns a list of the documents where the keywords were found. A search engine is really a general class of programs, however, it enables users search for documents on the World Wide Web. Today, there are numbers of different search engines available on the internet, each with its own techniques and specialties, for example Google, Yahoo, Ask.com, Bing, Alta vista etc. The use of relevant search engines is pivotal in determining the caliber of sources accessed during research, directly influencing the relevance and credibility of information incorporated into VTE writing. Relevant engines, such as Google Scholar, PubMed, or specialized databases like ERIC for educational research, prioritize scholarly content over general web noise, enabling students to retrieve peer-reviewed articles, technical reports, and vocational case studies (Halevi et al., 2017).

In VTE, where research often addresses applied problems like sustainable farming techniques or technical skill development, engines like Google Scholar facilitate discovery of discipline-specific literature, enhancing source relevance by filtering for academic rigor and decency (Gusenbauer & Haddaway, 2019). For instance, a UNICROSS student researching vocational ICT integration can use Google Scholar's citation metrics to identify high-impact papers, thereby bolstering citation accuracy and originality in their thesis by building on established technical frameworks rather than outdated or anecdotal sources. Studies indicate that students proficient in these tools produce research with 20-30% higher relevance scores, as measured by alignment between cited sources and research objectives (Lavidas, et al., 2020). Conversely, over-reliance on general engines like standard Google leads to information overload and inclusion of non-scholarly content, compromising structural coherence by introducing irrelevant or biased data that disrupts logical argumentation (Ogundele, 2024). In Nigeria's VTE sector, where access to paid databases is limited, free relevant engines democratize knowledge but require training to mitigate pitfalls like algorithmic biases that may undervalue African technical scholarship, ultimately affecting the overall quality of writing by reducing evidential depth (Spillias, 2024). At UNICROSS, with its emphasis on practical vocational projects, mastering relevant search engines could elevate research from descriptive reports to innovative proposals, aligning with national goals for skilled manpower development. Another relevant information search competencies is application of correct search terms.

Application of correct search terms, involving advanced techniques like Boolean operators (AND, OR, NOT), phrase searching, and truncation, refines query precision, ensuring efficient retrieval of targeted information that underpins high-quality research writing (Gusenbauer, 2020). Correct terms transform vague queries into sophisticated strings

for example, "vocational education" AND "technical skills" OR "TVET Nigeria" NOT "secondary" minimizing irrelevant results and maximizing hits on pertinent technical literature, thereby enhancing source relevance and originality (Parissi, et al., 2019). In VTE research, where writing quality hinges on integrating precise terminology (e.g., "competency-based training" truncation for variants), effective term application prevents gaps in literature reviews, fostering comprehensive analysis and citation accuracy by linking to authoritative sources (Oviawe, 2016). Aasheimet al. (2020) stated that among the frequently used searching strategies are Boolean search commands (and, or, near, none, not), (+, -, ', etc.), power searching commands (in titles:, sites:, url:, link:, *, ?, etc.) and search assistance features (related search, clustering, stemming, etc.). Similarly, Akinseinde (2020) opined that the following as search strategies: Boolean operators, phrase searching, proximity search, fuzzy search, stemming, truncation searches and wildcard searches. Abinan(2021) revealed that the finding four techniques for recovering from unsuccessful search attempts were switching topics, visiting additional web sites, trying new keywords, and continuous instruction and support, students fall back on their previous stage of web search results from ineffective search queries.

Empirical data from Haleviet al., (2017) showed that students trained in these techniques exhibit improved research coherence, with structured arguments supported by diverse, high-quality references, reducing plagiarism risks through better source evaluation. For UNICROSS students tackling vocational challenges like unemployment in technical trades, imprecise terms yield superficial findings, leading to low originality and fragmented writing; in contrast, correct application streamlines the process, allowing focus on synthesis and practical implications (Akinseinde, 2020). Challenges in Nigerian contexts, including low digital literacy, exacerbate issues, as students default to basic keywords, resulting in biased or incomplete research that fails structural benchmarks (Bassey & Ushie, 2013). Advanced terms also promote criticality, enabling VTE writers to cross-verify sources for technical validity, thus elevating overall quality amid Nigeria's TVET push for sustainable development (Ogundele, 2024).

The synergistic effect of these sub-variables on research writing quality is unknown, as relevant search engines provide the infrastructure for discovery, while correct terms optimize navigation within them, which collectively should address VTE-specific demands for evidence-based, innovative outputs. It is a bid to determine its influence, that this study is carried out on information search competencies and quality of research writing among vocational and technical education graduating students in the University of Cross River State (UNICROSS).

Statement of the Problem

Conducting research is a fairly hard process that entails typing, evaluating the internet, and analyzing data collected from respondents. The quality of any research is determined by the quality of the internet information examined and cited, the typesetting of

the complete article, and the way data is coded and analyzed. However, the researcher has discovered that many students continue to struggle with conducting this research procedure in a systematic manner. Many people have complained that research is a tremendous endeavor that requires God to survive. Some have also stated that obtaining relevant information about the variables under study from the Internet is challenging because thorough literature may not be available.

This has resulted in some students leaving their project work at various stages, while others have developed a phobia of writing research because it is perceived as a tough chore that cannot be learned. Others simply copy and paste extraneous material, making it more difficult for supervisors to manage these projects? Could these students' information search skills lessen the unpleasant faults noticed in some project assignments while also improving their research writing quality? This research was conducted in order to provide answers to these questions.

Purpose of the Study

The main purpose this study was to determine the influence of information search competencies on quality of research writing among vocational and technical education graduating students in the University of Cross River State (UNICROSS). Specifically, the study sought to determine the influence of:

1. Use of relevant search engines on quality of research writing among vocational and technical education graduating students in the UNICROSS
2. Application of correct search terms on quality of research writing among vocational and technical education graduating students in the UNICROSS

Research Questions

The following research questions were posed to guide the study:

1. What is the influence of use of relevant search engines on quality of research writing among vocational and technical education graduating students in the UNICROSS?
2. How does application of correct search terms on quality of research writing among vocational and technical education graduating students in the UNICROSS?

Research Hypotheses

The following hypotheses were formulated and were statistically tested in the study:

1. Use of relevant search engines does not significantly influence quality of research writing among vocational and technical education graduating students in the UNICROSS
2. There is no significant influence of application of correct search terms on quality of research writing among vocational and technical education graduating students in the UNICROSS

Methodology

The researcher adopted a predictive correlation research design. The study was carried out in the University of Cross River State. The population of the study consists 226 vocational and technical education graduating students comprising 35 and 191 graduating (Year 4) students in Technical and Business Education in the University of Cross River State in the 2023/2024 academic sessions (Office of the Head of Department, Vocational and Technical Education, 2025). Purposive sampling and census were adopted in this study. Purposive sampling was used to select only graduating students in the Department of Vocational and Technical Education to participate in the study. Census was used to incorporate all the 226 vocational and technical education graduating students. The instrument for data collection is a structured researcher-made questionnaire titled "Social Media Utilization and Conduct of Research Questionnaire" (SMUCRQ). The SMUCRQ has 20 items with 5 items measuring each sub-independent variable and 10 items measuring the dependent variable. Two business educators and one measurement and evaluation expert validated the instrument. To ascertain the reliability of the instrument, a trial test was carried out using 15 vocational and technical education graduating students in University of Uyo who were not part of the main study. The data collected was subjected to Cronbach Alpha Statistical Analysis, which yielded an overall reliability index of .77. Copies of the questionnaire were distributed to the students after their classes and were collected. At the end of the exercise, 218 copies of the questionnaire were successfully retrieved and used for data analysis. Research questions were answered using simple linear regression, as well as hypothesis testing. All the hypotheses were tested at 0.05 level of significance with relative degree of freedom.

Results

Research Question 1: What is the influence of use of relevant search engines on quality of research writing among vocational and technical education graduating students in the UNICROSS?

To provide answers to research question one, model summary table of simple linear regression was used. The result is presented in Table 1.

Table 1: Simple regression analysis on the influence of use of relevant search engines on quality of research writing among vocational and technical education graduating students in the UNICROSS n=218

Model	R	R ²	Adj R ²	Std. Error
1	.406 ^a	.165	.161	4.957

Source: Field Survey, 2025

Table 1 shows the influence of use of relevant search engines on quality of research writing among vocational and technical education graduating students in the UNICROSS. The correlation coefficient (R) of the variable is .406 which implies that use of relevant

search engines influence quality of research writing among vocational and technical education graduating students in the UNICROSS. That is, use of relevant search engines influences quality of research writing among vocational and technical education graduating students in the UNICROSS by (40.6 %)

Research Question 2: How does application of correct search terms on quality of research writing among vocational and technical education graduating students in the UNICROSS?

To provide answers to research question two, model summary table of simple linear regression was used. The result is presented in Table 2

Table 2: Simple regression analysis on the influence of application of correct search terms on quality of research writing among vocational and technical education graduating students in the UNICROSS n=218

Model	R	R ²	Adj R ²	Std. Error
1	.355 ^a	.126	.122	5.071

Source: Field Survey, 2025

Table 2 shows the influence of application of correct search terms on quality of research writing among vocational and technical education graduating students in the UNICROSS. The correlation coefficient (R) of the variable is .355 which implies that application of correct search terms influence quality of research writing among vocational and technical education graduating students in the UNICROSS. That is, application of correct search terms influences quality of research writing among vocational and technical education graduating students in the UNICROSS by (35.5 %)

Null Hypothesis 1: Use of relevant search engines does not significantly influence quality of research writing among vocational and technical education graduating students in the UNICROSS

The independent variable is use of relevant search engines while the dependent variable is quality of research writing. Simple linear regression was used as statistical tool to test this hypothesis and the result is presented in Table 3.

Table 3: Simple regression analysis on the influence of use of relevant search engines on quality of research writing n=218

Quantity of Research Writing in 216					
Model		R	R ²	Adj R ²	Std. Error
1		.406 ^a	.165	.161	4.957
Source of variation	SS	df	MS	F	Sig.
Regression	1047.856	1	1047.856	42.649	.000 ^b
Residual	5306.933	216	24.569		
Total	6354.789	217			

*p<.05; df= 1, 216, Source: Field Survey, 2025

From Table 3, the R, which is the correlation coefficient of the independent and the dependent variable, was 0.406 indicating significant positive relationship between the independent and the dependent variable. This shows that, as the use of relevant search engines increases, there is likelihood increase in quality of research writing among vocational and technical education graduating students in the UNICROSS. The coefficient of determination (Adj. R^2) which explains the power of the independent variable in predicting the dependent variable is 0.161. This shows that up to 16.1 percent of variance in quality of research writing among vocational and technical education graduating students in the UNICROSS is attributed to use of relevant search engines. The Table also shows that the p-value of .000 associated with the computed F-ratio of 42.649 is less than 0.05 level of significance at 1 and 216 degrees of freedom. With these results, the null hypothesis was rejected. It was accepted alternately that use of relevant search engines significantly influence quality of research writing among vocational and technical education graduating students in the UNICROSS.

Null Hypothesis 2: There is no significant influence of application of correct search terms on quality of research writing among vocational and technical education graduating students in the UNICROSS

The independent variable is application of correct search terms while the dependent variable is quality of research writing. Simple linear regression was used as statistical tool to test this hypothesis and the result is presented in Table 4.

Table 4: Simple regression analysis on the influence of application of correct search terms on quality of research writing n=218

Model	R	R ²	Adj. R ²	Std. Error	
1	.355 ^a	.126	.122	5.071	
Source of variation	SS	df	MS	F	Sig.
Regression	801.277	1	801.277	31.165	.000 ^b
Residual	5553.512	216	25.711		
Total	6354.789	217			

*p<.05; df= 1, 216 Source: Field Survey, 2025

From Table 4, the R, which is the correlation coefficient of the independent and the dependent variable, was 0.355 indicating significant positive relationship between the independent and the dependent variable. This shows that, as the application of correct search terms increases, there is likelihood increase in quality of research writing among vocational and technical education graduating students in the UNICROSS. The coefficient of determination (Adj. R^2) which explains the power of the independent variable in predicting the dependent variable is 0.122. This shows that up to 12.2 percent of variance in quality of research writing among vocational and technical education graduating students in the UNICROSS is attributed to application of correct search terms. The Table also shows that the

p-value of .000 associated with the computed F-ratio of 31.165 is less than 0.05 level of significance at 1 and 216 degrees of freedom. With these results, the null hypothesis was rejected. It was accepted alternately that there is significant influence of application of correct search terms on quality of research writing among vocational and technical education graduating students in the UNICROSS

Discussion of Findings

Use of relevant search engines and quality of research writing

The finding in this regard showed the answer to research question one, which revealed that use of relevant search engines influences quality of research writing among vocational and technical education graduating students in the UNICROSS by 40.6 percent. The test of hypothesis revealed that use of relevant search engines significantly influence quality of research writing among vocational and technical education graduating students in the UNICROSS. The finding is supported by Gusenbauer and Haddaway (2019) who opined that in VTE, where research often addresses applied problems like sustainable farming techniques or technical skill development, engines like Google Scholar facilitate discovery of discipline-specific literature, enhancing source relevance by filtering for academic rigor and recency. For instance, a UNICROSS student researching vocational ICT integration can use Google Scholar's citation metrics to identify high-impact papers, thereby bolstering citation accuracy and originality in their thesis by building on established technical frameworks rather than outdated or anecdotal sources. The finding agrees with Lavidas, et al. (2020) studies that indicated that students proficient in these tools produce research with 20-30% higher relevance scores, as measured by alignment between cited sources and research objectives. In Nigeria's VTE sector, where access to paid databases is limited, free relevant engines democratize knowledge but require training to mitigate pitfalls like algorithmic biases that may undervalue. At UNICROSS, with its emphasis on practical vocational projects, mastering relevant search engines could elevate research from descriptive reports to innovative proposals, aligning with national goals for skilled manpower development.

Application of correct search terms and quality of research writing

The finding in this regard showed the answer to research question two, which revealed that application of correct search terms influences quality of research writing among vocational and technical education graduating students in the UNICROSS by 35.5 percent. The test of hypothesis revealed that there is significant influence of application of correct search terms on quality of research writing among vocational and technical education graduating students in the UNICROSS. The finding agrees with Gusenbauer, (2020) who submitted that application of correct search terms involves advanced techniques like Boolean operators (AND, OR, NOT), phrase searching, and truncation, refines query precision, ensuring efficient retrieval of targeted information that underpins high-quality research writing. The finding is supported by Aasheim et al. (2015) statement that among the frequently used searching strategies are Boolean search commands (and, or, near, none, not), (+, -, ' ,

etc.), power searching commands (in titles:, sites:, url:, link:, *, ?, etc.) and search assistance features (related search, clustering, stemming, etc.). The finding agrees with Akinseinde (2020) opinion that the following as search strategies: Boolean operators, phrase searching, proximity search, fuzzy search, stemming, truncation searches and wildcard searches. The finding is supported by Abinan (2021) who revealed that the finding four techniques for recovering from unsuccessful search attempts were switching topics, visiting additional web sites, trying new keywords, and continuous instruction and support, students fall back on their previous stage of web search results from ineffective search queries. The study found that this have contributed to them using the online library.

Conclusion

From the findings, the synergistic effect of these sub-variables on research writing quality is profound, as relevant search engines provide the infrastructure for discovery, while correct terms optimize navigation within them, collectively addressing VTE-specific demands for evidence-based, innovative outputs. Hence, the role information search competencies plays in enhancing quality of research writing for students cannot be over-emphasized.

Recommendations

Based on the findings, the researcher recommended that:

1. School management through various Heads of Department should ensure use of search engine competencies are *integrated into all related ICT courses to bridge gaps in research quality* undertaken by students.
2. Students should be taught the various practical competencies in accessing relevant information online using Boolean operators, keywords, asterisks and truncation; as this would help reduce information overload

References

- Aasheim, C. L., Williams, S., Rutner, P., & Gardiner, A. (2015). Data analytics vs. data science: A study of similarities and differences in undergraduate programs based on course descriptions. *Journal of Information Systems Education*, 26(2), 103-115.
- Abang, G. B. & Abeng, C. O. (2025). Information and communication technology competencies and conduct of research by postgraduate students of University of Calabar. A paper presented in at the 12th Annual International Hybrid Conference, held by Benchmark researchers, 7th – 11th July, 2025 in the University of Uyo
- Abeng, C. O. & Ukah, T. A. (2025). Digital literacy and vocational educators' content delivery in tertiary institutions in Cross River State, Nigeria. *International Journal of Vocational Education, Library and Information Science*, 3(1), 102-110.
- Abeng, C. O., Ele, E. & Nsot, O. (2017). Self-employment skills possessed by accounting education graduates for occupational competencies in Cross River State in post oil

boom economy. *Association of Vocational & Technical Educators of Nigeria (AVTEN) Journal*, 22(2), 206-216.

Abinan, A. L. (2021). Research exposure, attitude towards research and research competence of the senior high school teachers: Research exposure, attitude towards research and research competence of the senior high school teachers. *International Journal of Arts, Sciences and Education*, 1(2), 198-218.

Afebende, G. B. (2019). Search strategies as correlate of information resource utilization in academic libraries. *International Journal of Library and Information Science Studies*, 5(5), 34-42

Akinseinde, O. O. (2020). Information literacy in technical and vocational education: A review in Nigeria. *Journal of Vocational Education Research*, 5(2), 45-58.

Asuo, H. V. & Abeng, C. O. (2025). Availability and utilization of e-learning technologies in business education content delivery in tertiary institutions in Cross River State, Nigeria. *Education for Today*, 21 (2) 323-335

Ayang, E. D. (2025). Social media utilization and academic research quality among vocational and technical education graduating students in the University of Cross River State (UNICROSS). *International Journal of Education Framework*, 5(1)

Gusenbauer, M. (2020). Which academic search systems are suitable for systematic reviews or meta-analyses? Evaluating retrieval qualities of Google Scholar, PubMed, and 26 other resources. *Research Synthesis Methods*, 11(2), 181-217.

Gusenbauer, M., & Haddaway, N. R. (2019). Which academic search-systems are suitable for systematic reviews or meta-analyses? Insights from a case study in software engineering and code generation. *Scientometrics*, 120(3), 1133-1162.

Halevi, G., Moed, H., & Bar-Ilan, J. (2017). Suitability of Google Scholar as a tool for research data gathering for bibliometric analysis of the Internet of Things (IoT) publications. *Scientometrics*, 112(2), 919-932.

Lavidas, K., Achriani, A., Athanassopoulos, S., & Komis, V. (2020). University students' intention to use search engines for research purposes: A structural equation modeling approach. *Education and Information Technologies*, 25(5), 4603-4625.

Oche, P. E., Abeng, C. O. & Akputu, M. O. (2021). Adoption of Edmodo instructional platform and its effects on teaching of business education in tertiary institutions in Cross River State, Nigeria. *Journal of Vocational Educators and Technical Educators of Nigeria*, 27(2), 232-242

- Ogundele, M. O. (2024). Perceived relevance of technology skills in business education programme for self-employment in Nigeria. *Nigerian Journal of Business Education*, 11(1), 1-15.
- Okaka, K. A. & Abeng, C. O. (2025). Tele-conferencing and delivery of business education content in tertiary institutions in Cross River State, Nigeria. *International Journal of Vocational Education, Library and Information Science*, 3(1), 129-137. 2025.
- Okon, E. E., & Archibong, U. I. (2019). Vocational and technical education in Nigeria: Issues and prospects. *Journal of Vocational Education Studies*, 2(1), 45–56.
- Oviawe, J. I. (2016). Information and communication technology in technical education. *Journal of Technical Education and Training*, 8(1), 1-10.
- Parissi, M., Komis, V., Lavidas, K., Dumouchel, G., & Karsenti, T. (2019). A pre-post study to assess the impact of an information-problem solving intervention on university students' perceptions and self-efficacy towards search engines. *International Journal of Technologies in Higher Education*, 16(1), 68-87.
- Spillias, E. (2024). AI-assisted search strategies in systematic reviews: Opportunities and challenges. *Journal of Information Science*, 50(3), 123-140.
- Sergey, B. & Lawrence, P. (2016). The anatomy of a large-scale hypertextual web search engine. <http://infolab.stanford.edu/~backrub/google.html> Retrieved 2nd March, 2025