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AI in Graduation Project Writing: Analyzing Lexical Patterns to Measure Chat GPT's Impact in Technical Institutes

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Abstract— This study investigates the use of Artificial Intelligence (AI) in graduation project writing within technical institutes, addressing a significant gap in existing research. It examines the frequency and contextual usage of specific lexical items in 60 graduation projects across engineering, information technology, and applied sciences disciplines, aiming to identify patterns indicative of AI-generated content. Employing a systematic comparison of projects submitted before and after the release of ChatGPT (November 30, 2022), the research tracks targeted lexical items. Findings reveal a dramatic increase in AI-associated vocabulary, with the AI index average rising from 6 (pre-ChatGPT) to 25 (post-ChatGPT). Notable increases include "underscore/underscoring" (2200%) and "navigate/navigating" (1900%). The study concludes that while AI tools can enhance technical writing quality and reduce plagiarism, they also lead to homogenized writing styles and raise concerns about academic integrity and practical skill development in technical education.

Keywords: *Artificial Intelligence, MA thesis writing, lexical patterns, ChatGPT influence, academic integrity*

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الملخص—تتناول هذه الدراسة استخدام الذكاء الاصطناعي في كتابة مشاريع التخرج داخل المعاهد التقنية، معالجةً فجوة كبيرة في الأبحاث الحالية. تفحص الدراسة تكرار واستخدام عناصر لغوية محددة في سياقاتها داخل 60 مشروع تخرج عبر تخصصات الهندسة وتكنولوجيا المعلومات والعلوم التطبيقية، بهدف تحديد الأنماط الدالة على المحتوى المُنتج بالذكاء الاصطناعي. باستخدام مقارنة منهجية للمشاريع المُقدمة قبل وبعد إطلاق ChatGPT (30 نوفمبر 2022)، تتعقب البحث العناصر اللغوية المستهدفة. تكشف النتائج عن زيادة هائلة في المفردات المرتبطة بالذكاء الاصطناعي، حيث ارتفع متوسط مؤشر الذكاء الاصطناعي من 6) قبل (ChatGPT إلى 25) بعد .ChatGPT) تشمل الزيادات الملحوظة كلمتي "يُبرز/إبراز" (2200٪) و "يتيح/يتيح" (1900٪). تخلص الدراسة إلى أنه بينما يمكن لأدوات الذكاء الاصطناعي تعزيز جودة الكتابة التقنية والحد من الانتحال الأدبي، فإنها تؤدي أيضًا إلى تجانس الأساليب الكتابية وتثير مخاوف بشأن النزاهة الأكاديمية وتطوير المهارات العملية في التعليم التقني.

Introduction

The integration of Artificial Intelligence (AI) technologies has transformed academic and technical writing practices, particularly in graduation projects that serve as capstone experiences in technical education. While AI's role in general academic contexts has been explored, its specific impact on graduation projects characterized by practical applications, problem-solving focus, and industry-

oriented documentation—remains understudied. This research addresses this gap by examining how AI tools influence writing patterns in technical graduation projects.

The proliferation of AI-generated content raises critical questions about authenticity, practical skill development, and the evaluation of student competencies in technical fields. This study aims to:

Analyze frequency changes in specific lexical items in graduation projects after Chat GPT's release.

Identify patterns indicating AI influence and inform ethical guidelines for technical education.

Literature Review

The emergence of advanced AI text generation systems, particularly GPT-3 and its successor GPT-4, has fundamentally transformed the landscape of academic and technical writing. These sophisticated language models provide comprehensive assistance across multiple dimensions of the writing process, including documentation, report composition, and editing. While these technological advancements offer significant benefits in terms of efficiency and accessibility, the academic community continues to express substantive concerns regarding their potential impact on critical engagement and the development of essential practical skills.

Within the specific context of technical education, where hands-on experience and the ability to produce authentic, original documentation are considered fundamental competencies, the integration of AI-powered writing tools demands particularly careful examination. The very nature of technical education emphasizes not only the acquisition of theoretical knowledge but also the cultivation of practical abilities that are crucial for professional success.

This study employs genre analysis, following the established framework developed by Swales (1990), as a methodological approach to understand how AI-generated content aligns with or diverges from conventional patterns of technical documentation. Swales' concept of discourse communities and move analysis provides a structured basis for examining the organizational and linguistic features characteristic of specific genres. By applying this analytical framework, the research aims to systematically assess AI's influence on lexical choices and rhetorical patterns in graduation project reports, thereby contributing to a more nuanced understanding of how artificial intelligence is reshaping technical communication practices in educational settings.

The investigation specifically focuses on identifying potential homogenization of writing styles, changes in technical vocabulary usage, and alterations in rhetorical moves that might indicate AI intervention. This detailed analysis seeks to illuminate both the benefits and challenges associated with AI integration in technical writing education, providing valuable insights for educators and policymakers navigating this evolving technological landscape.

Methodology

A systematic comparative analysis was conducted on 60 graduation projects from various technical institutes, comparing those submitted before and after Chat GPT's release.

Procedure:

1. Lexical Item Identification: 12 AI-associated lexical items were selected based on preliminary analysis.
2. Frequency Analysis: Automated tools quantified occurrences in project documentation.

3. Threshold Establishment: Pre-ChatGPT usage levels served as a baseline for comparison.

Target Lexical Items:

- Delve into/delving into
- Realm/realms
- Multifaceted/multi-faceted
- Tapestry/tapestries
- The journey (rhetorical)
- Pivotal
- Underscore/underscoring
- Intricate/intricacy
- By + verb+ing (sentence-initial)
- Overall (sentence-initial)
- Navigate/navigating
- Shed light/shedding light

Results and Analysis

Overall Trends

- AI Index Average: Increased from 6 to 25 (316% rise)
- Extreme Values: Highest recurrence jumped from 12 to 185
- Plagiarism Index: Decreased from 24% to 19%

Graph 1: AI Index Average Comparison in Graduation Projects

Results - Analysis of Specific Lexical Items

The table and analysis below show the dramatic changes in the usage of specific phrases.

Pre-Chat GPT: [redacted]
Post-ChatGPT: [redacted]

Graph 2: Plagiarism Index Trend in Technical Documentation

Pre-ChatGPT: [redacted]
Post-ChatGPT: [redacted]

Lexical Item Analysis

Table 1: Recurrence of Lexical Items Before and After ChatGPT

Lexical Item	Before AI	After AI	Percentage Increase
Underscore/underscoring	2	46	2750%
Navigate/navigating	1	20	2400%
Multi-faceted/Multifaceted	2	19	775%
The Journey	5	28	460%
Pivotal	8	38	438%
Delve into/Delving into	9	35	300%
Tapestry	0	4	350%
Realm	18	55	216%
Intricate/Intricacy/ies	15	46	217%
Overall	12	32	140%
By + doing	28	45	72%
Shed light/Sheds light	35	42	18%

Graph 3: Top 6 Lexical Items with Highest Increase in Projects

Interpretive Analysis

- The significant increase in "underscore/underscoring" reflects AI's tendency to emphasize conclusions in project documentation
- Rise in "navigate/navigating" indicates AI-driven process description in technical methods
- Increased use of "multi-faceted" suggests AI's preference for complex problem characterization
- Growth in "the journey" points toward narrative structuring of project methodologies

Discussion

Documentation Quality vs. Authenticity: AI enhances formal quality but may mask inadequate practical understanding Methodology Description Shift: Movement from direct procedural description to narrative explanatory styles Practical Skill Assessment Challenges: AI assistance complicates evaluation of genuine technical writing abilities Theoretical Implications

Using Systemic Functional Linguistics:

Experiential Metafunction: Overuse of "delve into" and "multi-faceted" creates artificial technical depth

Textual Metafunction: Mechanical use of "overall" and "by doing" leads to standardized project documentation structure

Implications and Recommendations

The findings of this study present significant implications and recommendations across pedagogical, institutional, and industry domains that require coordinated attention and action.

From a pedagogical perspective, educational institutions must proactively integrate AI-aware assessment frameworks into their evaluation of graduation projects. This strategic shift involves developing comprehensive rubrics that account for potential AI assistance while rigorously maintaining academic integrity. Furthermore, there exists a critical need to design targeted exercises that emphasize authentic technical documentation skills, deliberately moving beyond the formulaic writing patterns often associated with AI-generated content. Students require systematic training in the ethical application of AI tools specifically tailored for project reporting, ensuring they develop a nuanced understanding of both the capabilities and limitations of these technologies in professional technical communication.

At the institutional level, technical institutes should establish formal disclosure protocols that mandate students to transparently acknowledge any AI assistance utilized in their project documentation. Concurrently, evaluation criteria must be fundamentally adapted to prioritize demonstrated practical understanding and genuine technical competence over merely polished writing quality. To effectively complement these measures, institutions need to implement robust project defense mechanisms that actively verify student comprehension and authentic authorship through detailed questioning and practical demonstrations, thereby ensuring that graduation projects remain genuine reflections of student capabilities.

The industry alignment dimension demands that graduation projects consistently maintain their role as authentic representations of practical skills that directly align with workplace expectations. There is a growing necessity to develop industry-relevant documentation standards that thoughtfully accommodate appropriate AI use while carefully preserving the core values of genuine technical communication. This approach should be coupled with strategic initiatives that promote transparency in technical communication practices, ensuring that future professionals understand how to responsibly leverage AI tools without compromising the integrity and accuracy of their technical documentation. This tripartite approach—encompassing pedagogical innovation, institutional policy reform, and industry collaboration—creates a comprehensive framework for addressing the challenges and opportunities presented by AI integration in technical education.

Conclusion

This study provides compelling evidence of Chat GPT's substantial influence on lexical and stylistic patterns within technical graduation projects. The analysis reveals a marked shift in language use, characterized by a significant increase in AI-associated lexical items and a movement toward more standardized, and at times artificially sophisticated, writing styles. While AI tools undeniably offer advantages in enhancing the formal quality and structural coherence of project documentation, their

pervasive use introduces critical challenges related to the authenticity of skill assessment and the accurate evaluation of practical competencies.

The findings underscore an urgent need for technical education systems to develop nuanced strategies that thoughtfully harness the benefits of AI—such as improved writing efficiency and accessibility—while safeguarding the fundamental purpose of graduation projects as authentic demonstrations of student-driven learning and capability. Achieving this balance requires rethinking assessment frameworks, reinforcing ethical guidelines, and fostering a culture of transparency in AI use.

Looking ahead, future research should prioritize the development of reliable, project-specific AI detection mechanisms and explore differentiated frameworks for the responsible integration of AI across various technical disciplines. Further investigation is also needed to understand the long-term impact of AI assistance on the development of critical technical communication skills and professional identity. By addressing these areas, educators and institutions can better navigate the evolving landscape of AI in education, ensuring that technological advancement supports rather than undermines the core goals of technical training and professional preparation.

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