



DIETRICH IT PROPOSAL

IMPROVING IT PROCESSES WITH AI

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Prepared for

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Carnegie
Mellon
University

Dietrich Computing &
Operations

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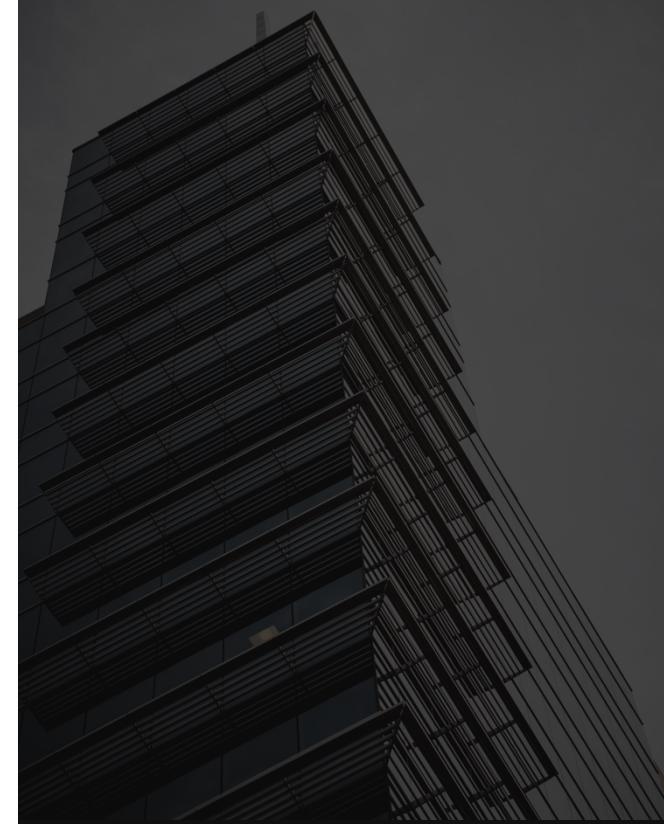
BACKGROUND

About The Client

Dietrich Computing and Operations (DCO) is an IT department that provides hardware and software assistance to university-owned systems at Carnegie Mellon University (CMU). Their services are primarily aimed at professors and students. Their services are limited to specific computer models that are Dietrich-owned but will attempt to assist everyone who requests technical support. DCO's dedicated team will assist in any way possible with troubleshooting, software, or general questions.

DCO's Vision

DCO supports CMU's mission by providing technical support to students and staff. They ensure access to otechnical resources and enable CMU's engaging and renowned educational experience through their expertise in supporting IT operations. Through dedicated IT services, they promote the growth of a transformative community while facilitating a collaborative environment within Dietrich College. Additionally, DCO is crucial in driving positive societal change by engaging with external partners and being a reliable resource to campus and community members.



CMU's Mission Statement

Education

To create a transformative educational experience for students focused on deep disciplinary knowledge; problem-solving; leadership, communication, and interpersonal skills; and personal health and well-being.

Community

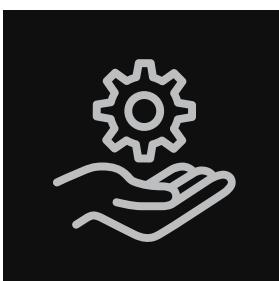
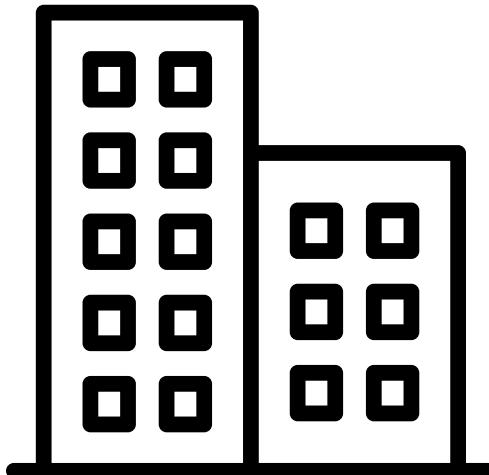
To cultivate a transformative university community committed to (a) attracting and retaining diverse, world-class talent; (b) creating a collaborative environment open to the free exchange of ideas, where research, creativity, innovation, and entrepreneurship can flourish; and (c) ensuring individuals can achieve their full potential.

Society

To impact society in a transformative way — regionally, nationally, and globally — by engaging with partners outside the traditional borders of the university campus.

DCO Services

Dietrich College is one of the primary colleges for teaching students. DCO supports the mission of the overarching University through its skillset and ability to promote the functionality of Dietrich systems and the output of students and staff. Maintaining reliability and functioning equipment and systems is critical to the department to foster a productive environment free of disruption. DCO also pilots many initiatives and has built up trust throughout its years of operations and collaboration. Here are the primary services that DCO provides:

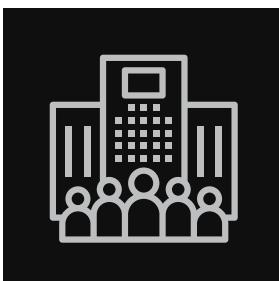


Help Desk Services

Includes consulting, data backup, and purchasing. Devoting time to these projects is costly as time and infrastructure are limited for staff

Administrative Infrastructure

Facilitated and provided by DCO. They are collaborative partners with Computing Services in setting up software and hardware for the college and assist with maintaining applications and systems.



Research Infrastructure

A magazine is a periodical publication, which can either be printed or published electronically. It is issued regularly, usually every week or every month, and it contains a variety of content. This can include articles, stories, photographs, and advertisements.

DCO Team

DCO comprises dedicated individuals to support Dietrich College's education endeavors and success. The client representative (Vincent) realized and pursued the project initiative to revamp the use of AI in the IT help desk at CMU. George will be the person of contact with whom we can communicate our needs during the project due to his programming experience and familiarity. The completion of the project will impact each member, and it will be critical to involve them in defining the scope and testing any solutions. The DCO members noted from the client interview are:

CARL

Assistant
Director Of
Research
Infrastructure

GEORGE

Senior Data
Analyst

JEN

Process
Improvement
Analyst

JERMEY

Associate
Systems
Analyst

MARK

Help Desk
Manager &
Client
Services

NICOLE

Communications
Project Manager

VICTOR

DCO
Student
Intern

VINCENT

Associate
Dean Of IT
Operations

Staff Training and Tools

Regarding computer office applications, the staff members have access to tools like Box, Microsoft tools (e.g., Word, Excel, PowerPoint), and Google tools (e.g., Google Docs, Sheets, Slides). The staff members can request credentials and training for the specific tools or technologies they need. While the staff members have some level of familiarity with the available technologies, Vince has conveyed that there are too many systems at their disposal, which can be overwhelming. Information currently flows electronically between staff, primarily through Google Chat. However, there is a desire to transition to Microsoft Teams for streamlined internal communications and improving information flow.



Microsoft Suite

Microsoft tools are available to the staff members, who can request credentials and training for specific tools or technologies as needed.



Google Tools

Currently, information flows electronically through Google Chat, but there is a desire to transition to Microsoft Teams for internal communications and improved information flow.



System Proliferation

Client concerned about the excessive number of systems and the resulting complexity. Having numerous tools and applications add to confusion, increase the learning curve for new employees, and make it difficult to maintain standardization.

THE THISTLE –
STRENGTH
BRAVERY
DETERMINATION
DEVOTION
DURABILITY



Technology Infrastructure

The organization primarily manages information electronically in most of its processes. According to Vince, information should ideally be entered only once, suggesting a preference for streamlined data entry processes to avoid inefficiency.

Streamlining information management processes can reduce human error, limit duplicate work, increase efficiency, and improve accuracy. Transitioning to a user-friendly information system platform like Microsoft can facilitate collaboration and provide streamlined tools and features for DCO's information flow.



DCO's Platforms



Software	Uses
Microsoft Office Suite	Access to Microsoft Word, Excel, and PowerPoint for creating and editing documents. DCO, however, would like to transition to Microsoft tools for streamlining purposes.
Google Suite	Information currently flows electronically between DCO staff, primarily through Google Chat. Google Chat also allows DCO staff to have quick conversations.
Box	DCO utilizes Box for file sharing and storing information on a centralized platform.
Zoom	Staff uses Zoom for video conferencing and online meetings.
MongoDB	The current databases have been built by George, utilizing secure and regulated databases programmed in MongoDB. As these databases contain sensitive student data, it is essential to adhere to regulations.

Information Management

There is a need for streamlining information flow, collaboration tools, and securing data.

However, the department wishes to free up the resources and time of IT support staff that are inefficiently utilized in answering support tickets. The objective is to get ahead of the evolving technology space and implementation of artificial intelligence as it will reshape the IT support landscape in the following years. Reworking job descriptions and reducing time spent addressing support tickets for IT help desk employees ahead of this evolution can promote job security for the department and allow them to contribute to more impactful projects that benefit the University's mission.

IT support and technology needs/operations at Dietrich College are managed by DCO. They serve as the point of contact for technical assistance through email support ticket requests. DCO's role encompasses supporting the technology infrastructure, resolving technical issues, and safeguarding the security and privacy of data within the organization. DCO aims to efficiently handle maintenance tasks, collaboratively make decisions, and uphold strong relationships with the faculty and students of Dietrich College to foster an innovative technology environment.



PROJECT OPPORTUNITY



The organization is facing several problems and challenges that should be addressed. Notable problems that DCO faces include:

Inefficient Information Management

The organization relies on the electronic management of critical information but is not fully optimized. This wastes several DCO staff hours due to processes such as manual data entry and a lack of automation when processing and responding to incoming support tickets.

Workload is Overwhelming

The department is understaffed and faces a high demand for expertise from the university. Given the time constraints, this results in limited resources and makes it challenging to complete all tasks.

Transition to a New Platform

Currently, there are many tools and applications that DCO relies on, leaving the team with no centralized platform for knowledge sharing or a singular source of truth. DCO wants to switch to Microsoft for centralized platforms and tools to streamline its electronic processes. This would reshape the format of subsequent DCO projects, communication, documentation, etc.

Manual CMU Processes

Many processes at CMU are currently done manually. The future vision proposed by Vincent is to leverage AI, particularly in the Dietrich Computing department, and pioneer the benefit of AI for process efficiency for the university.

Lack of Documentation

The documentation within the department lacks structure, making it difficult for staff to access and utilize information effectively. This will add additional difficulties for new hires, leaving many repetitive IT processes undocumented for clarification or reference.

IT is Evolving

AI challenges job security in the IT support sector as automation increasingly replaces routine tasks traditionally performed by support professionals. The need for staff to adapt and learn new skills will be imperative to remain relevant in the field.

Solving these problems is important to DCO because they cause inefficiencies, errors, and wasted department resources. One approach the department could benefit from is improving information management and documentation structure, as the organization can enhance efficiency, have references for support and processes, and save time for newly hired staff.

However, the department wants to implement AI tools like OpenAI or Google Bard to improve productivity and simplify processes. This will allow DCO to shift more effort into initiatives and directives supporting CMU's mission, as they can save hundreds of work hours currently used to draft ticket responses. It will enable the organization to handle tasks such as email generation and form management more efficiently while reducing human error. The organization can also enhance its services and processes, such as documentation, by embracing AI technology to generate and modify documents more effectively. Furthermore, if successful, DCO could pioneer how other colleges could benefit from it if successfully implemented.

Stakeholders

Notable stakeholders and users of the project would include general DCO employees, faculty, staff, students, and executives at CMU. By automating administrative tasks, the solution directly benefits these stakeholders by improving efficiency, reducing errors, and enabling staff to focus on high-value initiatives that support the mission of CMU. Additionally, the project sets the stage for other departments across the university to adopt similar AI-driven solutions, expanding the impact and benefits campus-wide.



The primary stakeholders of the AI project initially will be the DCO staff responsible for the IT help desk of Dietrich College. Leveraging AI can help automate administrative tasks and improve information management within Dietrich Computing. As a result, the staff members would benefit from increased efficiency and reduced workload. The AI system would streamline processes such as responding to support tickets, generating emails, and managing forms, allowing the staff to allocate their expertise towards more impactful projects and initiatives. This would enhance overall service quality for faculty and students' experience with IT support. Moreover, the project's success would position DCO as a pioneer in AI implementation, fostering a culture of innovation and driving transformative change across the university.

Project Vision

Proposed Project Vision

We aim to leverage artificial intelligence (AI) into information management systems within the Dietrich Computing department at CMU to further department capabilities and processes. This summer initiative aims to identify the challenges and solve inefficient university processes, unstructured documentation, and resource limitations by implementing generative AI.

Primary Goal

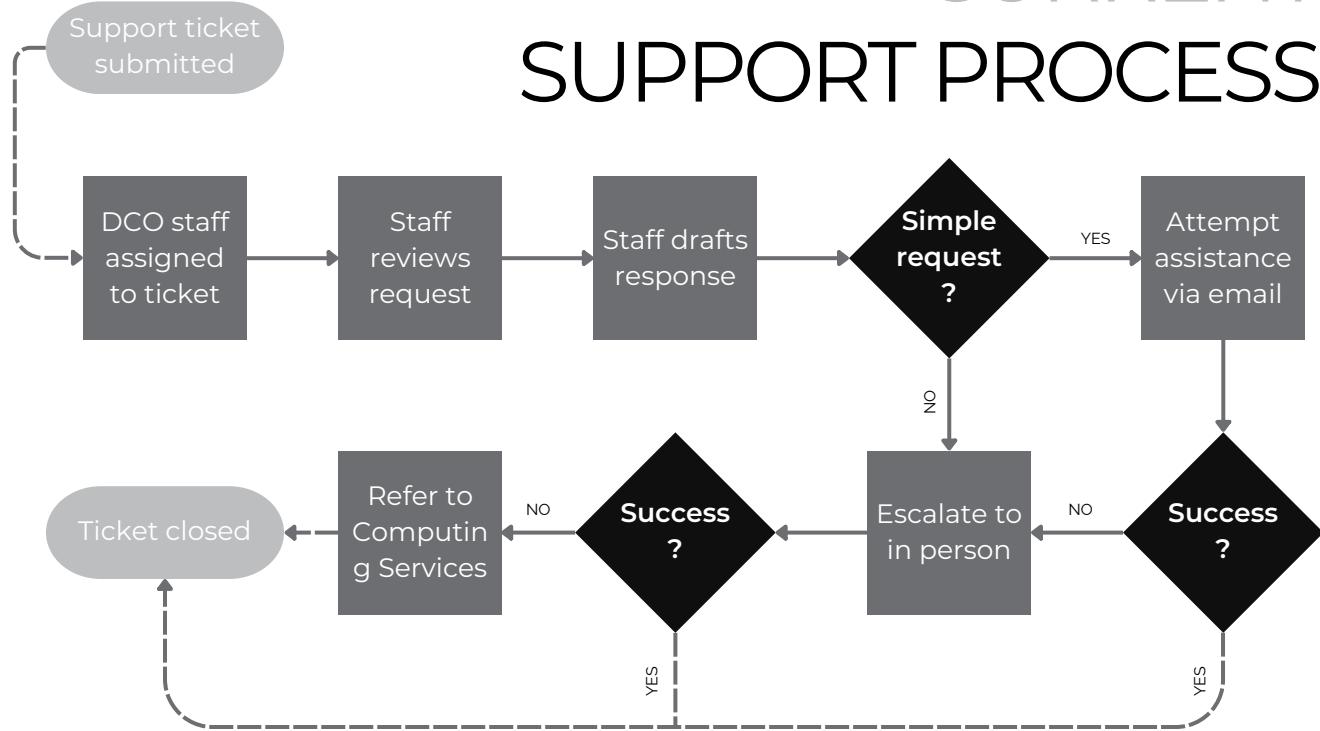
DCO's primary goal is to implement generative AI in responding to support tickets sent to the department's Gmail. Automating administrative tasks, such as email generation, saves time and resources. This would also allow staff to allocate their expertise towards more impactful initiatives and projects that would better support the university. It would also increase productivity and lower response times, enhancing overall service quality for faculty, staff, and students. Lastly, our project positions DCO as a pioneer in AI implementation, fostering a culture of innovation and driving transformative change across the university.

Other Initiatives

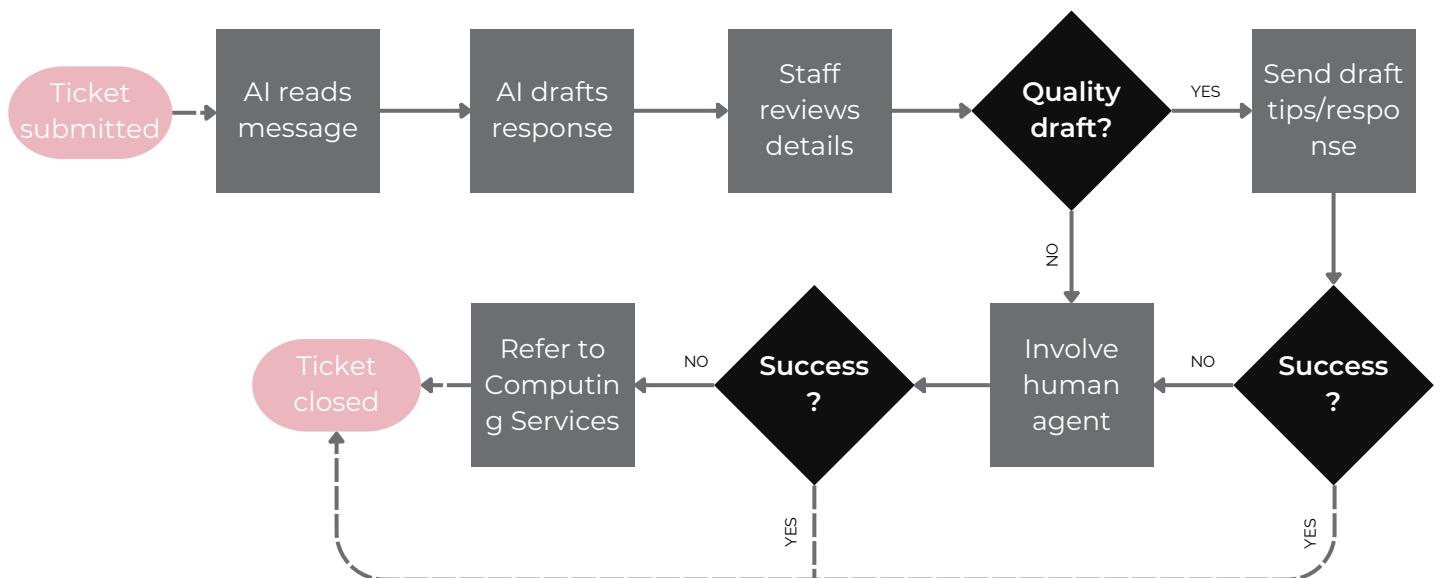
DCO has subsequent goals and projects throughout the Summer that would potentially parallel the primary goal of implementing AI. Every initiative reported is documented in the table below.

Projects and Goals	Impact	Priority
Implementing/scaling AI within Dietrich Computing	High	High
Automating form management	High	Medium
Improving student-facing processes (e.g. DC gen-ed course ranking)	Medium	Medium
Reducing paper processes of the university	High	Low
Transitioning to Microsoft Teams	Medium	Low

CURRENT SUPPORT PROCESS



CONCEPT SUPPORT PROCESS



POTENTIAL SOLUTIONS



Azure OpenAI

This solution would involve the functionality and generative features of OpenAI while remaining FERPA and HIPAA compliant as an Azure product. Would also further promote the DCO transition to Microsoft Suite.



CRM Platform

a Customer Relationship Management (CRM) platform will provide a centralized method for storing user information, support tickets, and communication history.



Gmail + AI

This approach would be a hybrid approach as it involves human input while leveraging pre-existing plugins to assist in response generation.



Fine-tuned AI

The process will involve training an AI model on a dataset of historical support conversations to predict responses to common issues better.



Custom Solution

Hosting a website through a platform such as WordPress and checking if they have extensions such as AI chatbot plugins or ticketing systems.



Ivy.AI

An AI pre-trained with the help of a vendor to answer commonly asked questions based on a knowledge base of information compiled by DCO and Dietrich College.

Maintaining the Current Process

Maintaining the current process of replying to support tickets. This would involve dedicating staff hours to replying strictly to tickets and likely requires the hiring of additional support staff to offset the demand for drafting responses and replying to repetitive support tickets.

This solution would be a continuation of the current DCO IT support process and would not efficiently alleviate the pain points of the support desk. Compensating additional staff would also be a concern. Overall, the solution would not be cost-effective or efficient as it would simply redirect current staff efforts onto new hires rather than leveraging technology to alleviate pain points.



Benefits

- Complex problem solving
- Emotional intelligence
- Adaptability to unpredictability
- Contextual understanding
- Reliant communications
- Trust and rapport



Drawbacks

- Poor scalability
- Costs and resources for hires
- Limited agent availability
- Time inefficiencies
- Human limitations such as fatigue
- Inconsistency in response accuracy
- Personal biases



Risks

LIKELIHOOD OF OCCURRENCE			
IMPACT	Low	Medium	High
	Low		
	Medium	<ul style="list-style-type: none">• increased costs• agent burnout• personal biases	<ul style="list-style-type: none">• limited scalability
High	<ul style="list-style-type: none">• limited adaptability		

Azure OpenAI Service

Pursuing Azure's OpenAI service would be the highest quality solution tailored to the client's requests. Azure OpenAI is highly secure, HIPAA/FERPA compliant, and utilizes GPT-4 all within Azure. Furthermore, there is well-written documentation supporting its usage and allows for fine-tuning of its models. This would also be a sound decision if truly feasible and cost-effective as it would allow for the beginning of DCO's transition to Microsoft's tools and office suite. The solution also addresses many of the other projects and pain points mentioned by the client, alongside aiding the IT support process and staff.

Azure prides itself on its cybersecurity and ensures that businesses can responsibly and safely use its OpenAI capabilities. It offers a flexible consumption-based price point which could be desirable for a smaller-scale organization such as DCO. On top of the GPT-4 pre-trained models, numerous features include fine-tuning, role-based access control, private networks, etc. This solution would provide the most favorable long-term outcome for DCO as they transition to Microsoft.



Benefits

- HIPAA & FERPA compliant
- Highly secure
- Scalable
- Pay as you go
- Training & fine-tuning
- Cost savings through automation
- Adaptable
- Documentation available
- Addresses the most DCO initiatives



Drawbacks

- Complex implementation with existing systems and workflows
- Data training dependency for effectiveness
- User experience with AI assistance
- Weak complex contextual understanding
- User and staff adaptation



Risks

		LIKELIHOOD OF OCCURRENCE		
		Low	Medium	High
IMPACT	Low			• user frustration
	Medium	• inaccurate responses	• adoption resistance	
	High	• data privacy/security	• algorithmic bias from training data	

Customer Relationship Management Platform

While this solution likely wouldn't be the most appropriate for the client and DCO, a CRM could greatly improve the efficiency of IT support at Dietrich College. It would allow for a centralized platform for users and staff to engage, collaborate, and receive assistance as needed. A CRM would also track user details and ticket history and relevant data. It would also allow for a more streamlined ticketing process through prebuilt labeling and tracking systems of support tickets.

There are also automation capabilities of various CRMs that could improve the DCO workflow. Additionally, CRM platforms typically provide analytics and metrics for staff, customer satisfaction, resource allocation, and would allow for more informed IT decisions and data-driven approaches.



Benefits

- Prebuilt and refined ticketing systems
- Centralized repository
- Data analytics and reporting
- Automation
- Collaboration



Drawbacks

- Complex integration with existing systems
- Data privacy concerns
- System downtime
- Reliance on vendor
- Potentially unnecessary costs or an abundance of features



Risks

		LIKELIHOOD OF OCCURRENCE		
		Low	Medium	High
IMPACT	Low			
	Medium		• over-reliance • integration	
	High	• vendor reliability • platform downtime	• data privacy/security	

Integrate OpenAI or Bard into Gmail

Integrating OpenAI directly into DCO staff's systems and Gmail would allow for a streamlined workflow for addressing support tickets as GPT capabilities would be at the staff's disposal upon reviewing an email. It would be very efficient in reducing staff hours consumed by support tickets by drafting responses and templates to requests, allowing the staff member to review the case more carefully and worrying less about generating replies.

However, integrating a plugin would likely come with many privacy and legal concerns and would not be an optimal solution for DCO. In a picture-perfect scenario where it would be possible to ensure that the solution would comply with regulations and standards that DCO must adhere to, then the solution would serve as a great tool for assisting IT support. Lastly, this solution would fix IT support inefficiencies rather than touching on multiple DCO initiatives, pain points, and use cases as the other solutions do.



Benefits

- Reduction in ticket response time
- Potentially analyze and route tickets
- Automated responses, templates, suggestions
- Data Analytics
- Seamless workflow for existing Gmail ticketing system



Drawbacks

- User privacy and security risks
- Continuous training and monitoring
- Complexity of integration
- Legal considerations
- Model biases



Risks

LIKELIHOOD OF OCCURRENCE

IMPACT	LIKELIHOOD OF OCCURRENCE		
	Low	Medium	High
Low			
Medium		• inaccurate responses • user adoption	
High		• vulnerabilities plugging OpenAI into Gmail	• data privacy breach • legal noncompliance

Fine-tuning OpenAI

Fine-tuning OpenAI on historical conversations provided by DCO or datasets would allow for a focused utilization of generative AI for IT and IT support desk purposes. The solution would allow for generative content and fine-tuning of the model for DCO support purposes. Response times and quality of drafts and templates to support tickets would improve immensely.

Configuration to be self-serviceable would allow 24/7 availability for Dietrich staff and students. If implemented successfully, the solution would also free up DCO staff hours to focus on more nuanced and complex tasks than repetitive processes that automation and generative AI could handle. The model could also serve as a tool if provided with DCO and Dietrich College knowledgebases and data. Still, it is not advisable as passing data through OpenAI queries would likely violate standards and regulations such as FERPA and HIPAA.



Benefits

- Refined accuracy
- AI-generated drafts/templates for tickets
- Time efficient for staff
- Quick responses and extensive knowledge from fine-tuned model
- Compliance with DCO support processes and guidelines for assisting users
- Scalable
- Consistent



Drawbacks

- Complex integration
- Quality of solution dependent on training data provided
- System requirements
- Data privacy
- No protection of data privacy
- Not likely compliant with FERPA/HIPAA
- Model biases



Risks

		LIKELIHOOD OF OCCURENCE		
		Low	Medium	High
IMPACT	Low			• inaccurate responses
	Medium		• AI technical disruption • adoption resistance	
	High	• algorithmic bias		• violation or data breach of sensitive data

Pre-built Support AI (Ivy.AI)

Ivy.AI is a company that develops and implements chatbots and virtual assistants for businesses and institutions. This would offer a prebuilt AI solution that could be fine-tuned with the vendor on datasets provided by Dietrich College and DCO. This would allow staff and students to gain answers to commonly asked questions regarding the college while also minimizing the need for technical support via human agents.

Currently, Computing Services has implemented this successfully and is open to collaboration to partner in the implementation of Ivy.AI for Dietrich College. They have had notable success and a reduction in human interactions for technical support. Additionally, there are further features on the vendor website, such as Quantum email. Quantum email is a Chrome plug-in that would allow for email using the fine-tuned brain that would also power the support bot to assist in generating accurate responses and drafting emails for staff review. This solution would directly address inefficiencies in the IT support space presented by the client and leverage the use of artificial intelligence for general or support questions regarding Dietrich College and its systems.



Benefits

- 24/7 Availability
- Scalable
- Measurable efficiency improvements
- Self-service features
- Cost savings through freeing staff hours
- Numerous features and functionality
- Data collection and analytics
- Customizability and integration with existing systems



Drawbacks

- Limited effectiveness on complex issues
- Weak understanding of nuanced queries
- Quality dependent on data and training
- Struggles with bad user inputs/prompts
- Significant initial training and integration efforts into existing systems
- Overreliance on chatbots could lead to user dissatisfaction and disconnect



Risks

		LIKELIHOOD OF OCCURRENCE		
		Low	Medium	High
IMPACT	Low			<ul style="list-style-type: none">• user acceptance• poor with nuanced queries
	Medium		<ul style="list-style-type: none">• response inaccuracy• algorithmic bias	
	High	(limited adaptability)		

Custom Website/Solution

This solution would encompass programming efforts from scratch and mixing solutions together to tailor it even further for DCO. Since the development capabilities of DCO is limited to minimal staff, a solution that requires minimal programming would be optimal for a custom solution.

One approach would be to host or create a website through WordPress and integrate a support tool such as Ivy.AI. This would allow Ivy.AI to be tailored to DCO's specifications, and we could direct Dietrich staff and students to a website for Dietrich-related questions and support requests. This solution would enable DCO to make the website as extensive or straightforward as the organization would like. DCO could also curate the website and make navigating through Dietrich College's knowledgebase simple and within a few clicks or queries through a custom-tailored solution.



Benefits

- User-friendly interface
- Minimal to no programming
- 24./7 availability and self-service
- Efficient ticketing
- Reduced support staff workload
- Central location for providing support and information regarding Dietrich College



Drawbacks

- Setup up complexity
- Increased learning curve due to having to configure multiple softwares
- Reliance on multiple vendors
- Data privacy concerns
- User adoption resistance



Risks

		LIKELIHOOD OF OCCURRENCE		
		Low	Medium	High
IMPACT	Low			• poor contextual understanding
	Medium		• misleading responses • emotional disconnect	
	High		• noncompliance with legal standards	• data privacy breach

Recommendation



Azure OpenAI

Adopting Azure OpenAI for the IT support desk at DCO would help address several projects and pain points and provide significant benefits. While there may be some challenges and initial overhead, the advantages of this solution outweigh them by addressing many of DCO's ongoing initiatives, such as the transition to Microsoft and the beginning of the roadmap for implementing generative AI at Dietrich College.

More Information on [Azure](#)

Feasible and Lowest Risk

The solution seems most reliable and secure, as it is HIPAA compliant and will abide by FERPA regulations when dealing with educational institution customers. It also offers a pay-as-you-go plan which would benefit DCO given the scale. This solution would also promote other DCO initiatives and provide streamlined workflows and efficiency in use cases outside of generative AI, as Azure already has many notable applications and tools. The most notable risks to prepare for would be algorithmic bias and pushing change for Dietrich, as Azure's OpenAI is tailored for businesses.

Expected Outcomes



Improved Efficiency and Cost Savings

With Azure OpenAI for IT support, DCO can automate tasks and get AI assistance, freeing support staff to focus on complex issues. This means faster solutions and less need for extra staff, which saves money.

Enhanced User Experience

Azure OpenAI has natural conversations and gives personalized assistance, so users get quick and accurate answers. This makes users happier, measured by surveys, and fewer complaints.

Streamlined Support Processes

Azure OpenAI understands how DCO works, making support simpler and standardized. It generates accurate solutions faster and follows protocol.

Increased First Call Resolution Rate

Azure OpenAI can learn DCO's systems and user problems, helping the support staff resolve issues efficiently and focus their efforts on other CMU mission-important initiatives. This means fewer escalations and faster resolutions.

Strong Security and Compliance

Azure OpenAI meets HIPAA and FERPA rules, keeping sensitive data safe. Using Azure's security features, DCO protects data and follows regulations, preventing breaches. Security audits and rule compliance measure the improvements.



PROPOSED SOLUTION ROADMAP

AZURE TRIAL

Experiment with Azure OpenAI's capabilities with their free trial and determine whether to proceed with the solution.

IMPLEMENTATION

Proceed by attempting to tackle the IT support desk inefficiencies listed by the client as the first major application of solution.

GET USER & STAFF FEEDBACK

Pilot the solution with staff and user testing to see how they respond to the features and functionality of OpenAI in the IT support realm.

SCALE SOLUTION TO DIETRICH

Incorporate solution into DCO's workflow if well received and maintain the solution. Scale to additional Dietrich IT projects.