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Using Generative AI to Assist a Smooth Transition from Industry Expert to College Professor - A Case Study

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Abstract

In the last decade, there has been an increasing trend in higher education to collaborate with industry professionals to develop curriculum and teach at universities. The goal is to bridge the gap between textbook theories and real-world practice. Survey shows that courses taught by professors that come from an industry background receive higher level of satisfaction and perceived career-readiness from students [1]; furthermore, learning knowledge and tools that are immediately applicable in the workplace gives students a comparative advantage for better employability, because learning under the guidance and expectations from the future employer alike sets them up for success [2].

While industry experts bring in their unique insights and relevant skill sets that are highly in demand in the job market, challenges lie within many aspects when they enter the academic environment [3]: their teaching strategy might be lacking of appropriate pedagogy; most of them do not have the opportunity to go through training/workshops that are tailored to full-time faculty; due to the nature of their part-time teaching position, it is also difficult to keep up with administrative tasks and navigate the constantly changing university policies and processes. It is for the best interest of the students that universities or programs to minimize or remove those obstacles by providing timely and quality support to help their transition into their teaching career and prevent them from feeling frustrated and disengaged and to set them up for success.

The Master of Engineering Technical Management (METM) is an online graduate program designed for working professionals in the engineering technical management fields [4]. Among the current 34 faculty members, only two (~6%) are full-time university employees, and 94% are talents working outside of the university, who “grew up” in a corporate environment before they started teaching in academia. Faculty onboarding consists of three main parts: a) course design onboarding that happened months before- these are meetings to finalize course content and teaching strategies for the upcoming semester; b) Human Resources (HR) onboarding for university employees; and c) learning management system (LMS) onboarding. As the program grows (larger enrollment, larger pool of industry talents), there comes a rising need to scale up and streamline faculty support.

This WIP paper aims at exploring the best approach to help industry experts transition to their instructor role in a university setting, using a case study methodology to look at the faculty onboarding & support mechanism in the METM program. The authors will leverage generative Artificial Intelligence (Gen AI) tools to create an interactive virtual assistant that can help industry professors, especially those who just joined the university appointment, find their teaching-related answers accurately and quickly. This AI assistant will be trained with knowledge base documents that are originally in non-interactive format, that covers (but not limited to) the aforementioned three-part onboarding.

This study will describe the creation of the AI assistant, compare different options, conduct user (faculty) testing, and discuss their first-hand experience of the tailored support. The majority of current research has been focusing on the instructional design aspect of teacher use cases; little to none on the administrative aspect, which left a gap for this study to fill. The result of this study will shed new light on how Gen AI technology could potentially improve the existing faculty support mechanism to meet the growing demand, as well as share a path forward for other institutions and programs facing similar challenges.
Keywords: ***Generative AI, Industry faculty, Onboarding.***

Background

Higher Education Today

Since the very first online university, University of Phoenix, opened its door to working professionals in 1976, obtaining an advanced degree while holding a full-time profession became possible - people can still pursue a degree from their dream university provided that they have the flexibility in time, money, and a lot of perseverance. Later, with the development of distance education technologies, such as internet access, online learning platforms, web communication and conferencing tools, there came the rise of modern online professional programs which cover many subject areas, such as engineering, computer science, nursing, psychology, and the popular

MBAs and executive education programs. Universities and colleges started to hire more part-time faculty to meet the rapidly growing demand of teaching positions.

According to the National Study of Postsecondary Faculty (NSOPF), as of fall 2021, about 48% of faculty were on part-time employment with US universities and colleges [5]. Hiring part-time faculty brings many benefits to both sides of the equation: financially speaking, hiring part-time faculty is more cost-efficient for universities and colleges than hiring full-time faculty, and provides more flexibility in budget [6]; part-time faculty normally hold another profession outside of the academia, it offers mobility and flexibility for talent in the industry to enter the higher education industry without long-term commitment; furthermore, industry faculty bring the practical knowledge into the classroom while upholding the rigor of degree-granting programs [7].

METM Faculty

The Master of Engineering Technical Management program is a lock-step, cohort-based online graduate program, designed for full-time working professionals. As a newly found professional program that belongs to the largest college (College of Engineering) in the university, METM program is quite "small" in terms of enrollment, number of courses offered, and faculty pool. Unlike individual departments, our small team of staff (less than five) handle a multifold of tasks that keep a program running, such as admission, logistics, marketing, recruiting, communications, as well as curriculum management, procurement, etc.

While we share a small amount of resources with our department (such as the business office), professors in our program do not fall in the category of a typical academic faculty: they are not aiming for tenureship or being evaluated by prestigious publication or size of grants, nor do they take up office space on campus or compete for classrooms; their sole mission is to teach & mentor.

A typical METM Faculty member, if only teaching one course, is scheduled to teach one standard semester (16-week), either in the fall or spring semesters, and take a break from

teaching in the summer. Because of the delivery format of the program, faculty are able to record their lectures ahead of time for asynchronous streaming; grading, giving feedback is also through the learning management system, Canvas, with the office-hours being the only live sessions- this provides flexibility for industry professors so that they can teach part-time while maintaining their full-time profession. Our faculty, on average, bring in 30 years of industry experience in their own fields; they are seasoned leaders and subject matter experts in areas such as financial decision making, organizational leadership, managing technical teams, project managements, etc.

Challenges

Research shows that industry professors are motivated to share their wisdom with students and inspire the next generation of leaders [3], which in return, creates a win-win situation for greater learning outcomes in professional-advancement seeking students [1] [2]. As one of the modern professional online programs, METM is thriving and well-loved by students and their employers. However, our part-time industry faculty, which is a small portion of all the part-time industry faculty population, faces its unique challenges.

The challenges lie within their transition from industry to academia settings [8]: teaching in an academic environment can be a significant change from leading an organization; there are different sets of processes, policies, reporting structures to follow as well as methodologies and tools to use, in order to achieve their teaching goal and assignments. For those who have not taught a course before, developing course materials and deploying effective teaching strategies can also be overwhelming [9]. The university does offer faculty workshops and course design lessons, however, it is difficult for part-time industry professors to locate sufficient time to participate. Furthermore, although a plethora of resources are available, where to look for resources or figuring out which one is best suited can be a mystery to solve. Normally, a new industry faculty must be onboarded, trained and get ready to teach only in a matter of months between the time that a new course is determined, and that they are identified as the subject matter expert, and the beginning of their teaching semester. Providing timely and curated support to facilitate their transition is vital in their teaching success, and ultimately, students' success and program success. Because of their unique position, typical faculty support and resources do not cater well to their needs.

Opportunities

In recent years, as generative AI took the center stage of technology development, there are emerging studies on utilizing artificial intelligence in effective employee onboarding [10] [11] and human resource management practices [12] [13]. However, currently, there have been few to none research studies that focus on utilizing artificial intelligence in faculty engagement and support. While new faculty can be treated as other new employees, industry experts who are transitioning into teaching in universities are also unique in their own ways as mentioned. With this understanding, the ultimate goal of this research is to explore the options to help industry professors navigate their "second" career with fewer obstacles and/or challenges, so that they can focus on teaching and instilling students with their expert knowledge.

The value of this paper lines in the power and autonomy that AI enables for small organizations, such as METM, to develop their own ai-powered support mechanism. It is common that developing, testing, deploying a new tool takes a considerable amount of time for any large organizations; instead of waiting for the parent organizations to develop (potentially) a generic one for them to use, small organizations have the mobility and options to customize their own for quick implementation.

Methodology

This study uses a case study approach to investigate the potential benefit of having an AI Assistant to facilitate the transition of new faculty who came from an industry background. The authors will discuss the current faculty support mechanism, and their strengths and weaknesses based on observations of interaction with new and existing program faculty from the past five years; then, describe the process of creating, training, and testing of an artificial intelligence (AI) powered assistant; and finally, discuss the user experience of faculty who volunteered to try out this new tool, as well as the limitations and future direction of this case study.

METM Faculty Support Mechanism

Current Design

Currently, there are three main parts of METM faculty onboarding. Assuming the faculty needs to create course content from scratch, Part A is **course design onboarding**, which happens months before their teaching semester. One of the authors of this paper is the designated faculty-support staff of the METM program. The onboarding consists of a series of meetings to discuss the structure and flow of the course content, faculty responsibilities, and teaching strategy based on the course-level learning outcomes (CLOs), while adhering to the overarching program-level learning outcomes (PLOs). Best practices and relevant topics from other courses in the program are shared with the new faculty, to ensure consistency of operation, avoid content overlapping, and integration of the entire curriculum so the courses build up sequentially. During this phase, faculty focus on content creation and compartmentalization based on the university academic calendar, which specifies key milestones of the semester, such as first day of school, students holidays, final exam days, etc. Other team members could also include instructional designers, teaching assistants for the course.

Part B is the **Human Resources (HR) onboarding** that is offered to all university employees (both faculty and staff). During this process, the new faculty hiring process concludes as they submit essential paperwork, complete required training (e.g. Information Security Awareness), and claim their login credentials to access different channels. Because the HR office serves a large pool of faculty, it can be challenging for new faculty to get a quick turnaround for their questions and issues encountered during this process.

Part C, **learning management system (LMS) onboarding**, ideally happens after faculty hiring is complete, because only after that, faculty will gain access to the LMS and see how their course is presented to students online. This is also normally right before their teaching semester starts, so they can apply this information immediately. The program faculty-support staff schedules a one-on-one meeting with the faculty, focusing on how to navigate around the LMS and different tools to interact with students. The key points discussed during this meeting are provided below (Figure 1); each LMS tour is customized based on the course activities and student deliverables. For example, a personal leadership coaching course is significantly different from a finance-focused class, in terms of student-instructor interactions, assessments, method of

engagement, etc., thus, this onboarding has not never been recorded or reused in another course onboarding.

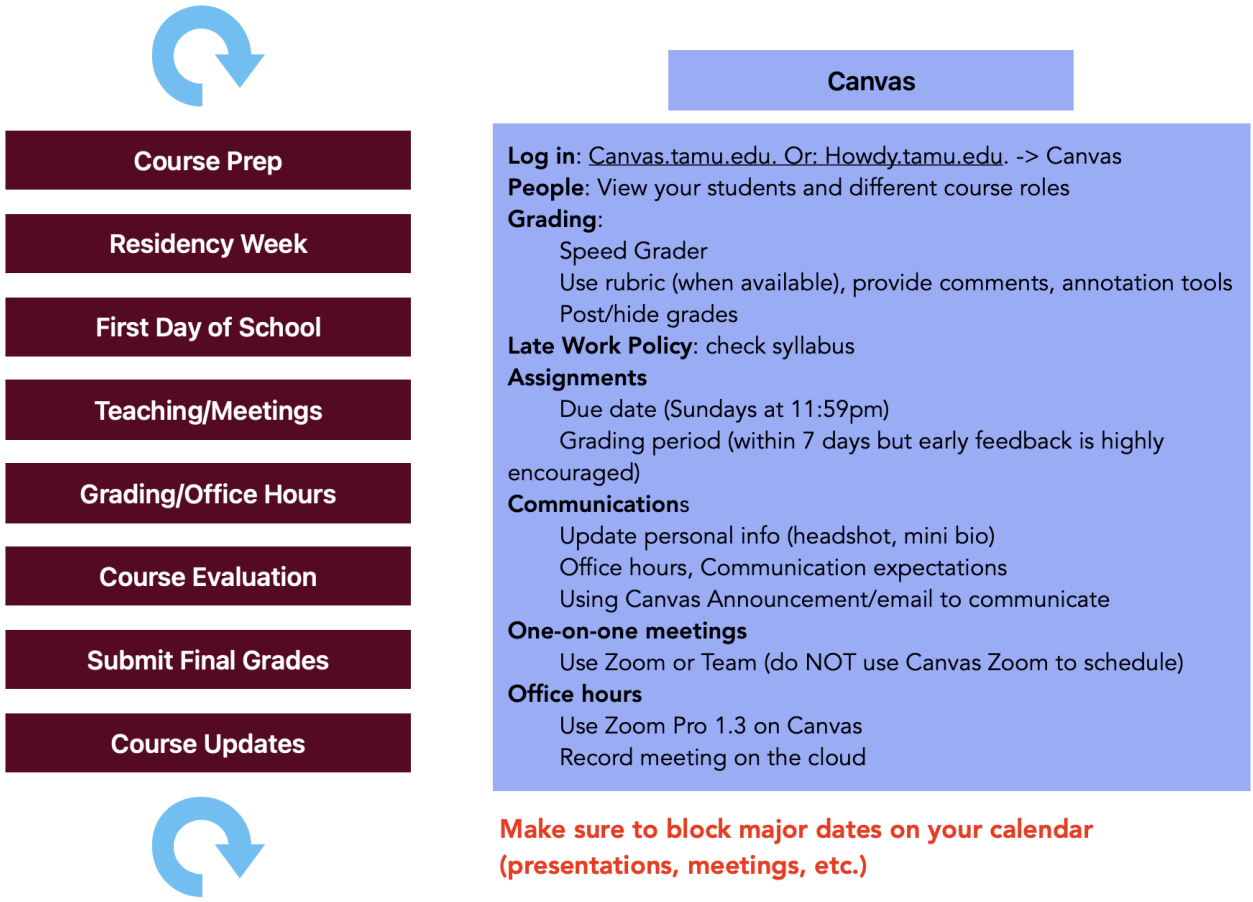

Figure 1. Key discussion points during LMS onboarding.

In addition, METM program has created a document called "METM Faculty Handbook" that covers a series of topics such as University Policies, Teaching Expectations, Program-specific Policies, Best Practices of teaching an online course. This approximately 20 page-long document incorporates details that cannot be covered with just one meeting; although it is well thought out, it can be overlooked or misplaced; it has not been shared regularly with faculty with updated content.

Challenges

Table 1 compares the pros and cons of the current faculty onboarding mechanism, which have become prominent as they have been implemented in the past five years in the METM program.a

Faculty Support Mechanism	**Pros**	**Cons**
Faculty Handbook	Easy to distribute; Relatively searchable; Little technical skills required to use.	Easy to lose; Long document; non-interactive; Cannot “cover-it-all”.
Designated program staff support	Curated, interactive support; Offers one-on-one sessions on-demand; Specific program knowledge; Short response time.	Difficult to scale.
University resources (HR, Teaching Resources)	Knowledgeable in general topics; Rich content; Team support.	No specific program knowledge; Delay in responses; Overwhelming to navigate.

Table 1. Pros and cons of current faculty support mechanism.

In the past five years of interaction with METM faculty, a few concerns have been regularly brought up- there are two types of challenges faced by a new industry faculty: internal challenges- such as reluctant to seek assistance, not knowing the right person to contact; and external challenges, such as not knowing resources available to them (trainings, workshops, etc.) and not having time to take advantage of these resources. For example, what do you do when you want to know the program policy on exams? Do you email, call someone, in order to find out which document or website to look at? The faculty-support staff has been a great resource, but a single person does not scale well when the program is growing in depth and breadth. It is with these challenges in mind, that we are looking for a supplementary tool that can bridge the aforementioned gaps and facilitate the transition from industry to academic teaching, something that can be a 24/7 resource, that faculty don’t feel hesitate to utilize, and that can serve as a knowledge base and point faculty into the correct direction if needed.

Potential Solution

Compare Different Options

As AI technology evolves everyday, new tools become available at the speed of light. An initial search of AI-powered knowledge base management tools revealed that: there are tools such as Perplexity and ChatGPT that allows team collaboration with Pro account subscriptions; integrated, large sized enterprise-oriented, safety enhanced tools such as Microsoft products (e.g. Azure AI); and more comprehensive, off-the-shelf tools such as Document 360, Guru, ZenDesk, just to name a few. When choosing the appropriate AI tool, we take the following features into consideration: user learning curve, dependency of operation (standalone or integrated), complexity of user interface, ease to update, cost, service provider reliability, privacy concerns, etc. Note this is not an ordered list, all of these characteristics are part of the selection criteria. See Table 2 for feature comparison results, green means favorable, red means less favorable.. Because we are at the testing phase of this project, based on the complexity of knowledge base information (relatively simple) and the size of the organization is not large (less than 50), we opted for a tool that is called Google NotebookLM.

Feature	Perplexity	ChatGPT	Azure AI	Copilot Studio	Document 360	Guru	Zendesk	Landbot	Google NotebookLM
User Learning Curve (Low, Medium, High)	L	L-M	H	M	L-M	L	M	L	L
Dependency of Operation (Standalone, integrated)	S	S	I	I	S	S/I	I	S	S
UI Complexity	Simple	Simple	Complex	M	M	Simple	M	Simple	Simple
Ease to Update (Low, Medium, High)	H	H	M	M	H	H	M	H	H
Cost	Free available	Free available	Pay per use	Subscription	Subscription	Subscription	Subscription	Subscription	Free available
Service Provider Reliability (Low, Medium, High)	H	H	H	H	M	H	H	M	H
Privacy Concerns (Low, Medium, High)	M	M	L	L	L	L	L	L	L
AI-Powered Search	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Yes
Customization (Limited, Medium, High)	Limited	Limited	H	H	H	H	H	M	H
Integration Capabilities (Limited, Medium, Extensive)	L	L	E	E	M	E	E	M	M

Table 2. Comparison of popular AI-powered knowledge management tools.

Creation of the AI Assistant

The diagram below shows the steps of how the AI assistant is created, deployed, and updated. Please note that the developer aspect of the AI tool is out of the scope of this study, thus will not be discussed; instead, we will focus on the application of this tool.

The basic steps are the same regardless of the choice of an AI tool (Figure 2.). The starting point is the Knowledge Base, i.e. materials that contain information that are relevant to METM faculty's teaching success; this consists of the Faculty Handbook, and additional Q&A document created based on some commonly raised questions by new faculty members.

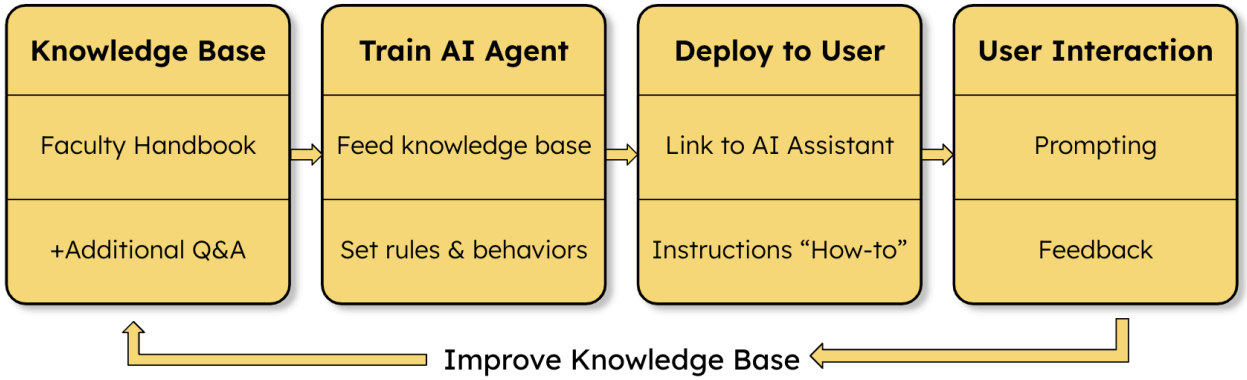

Figure 2. Process to create the AI Assistant.

Figure 3 is a screenshot of what Google NotebookLM can offer with free Google Account, after just one knowledge base document, METM Faculty Handbook was uploaded. At a glance, it is capable of generating AI-powered answers, creating a two-host, downloadable, podcast-style audio clip, summary of this source material, FAQ, etc.

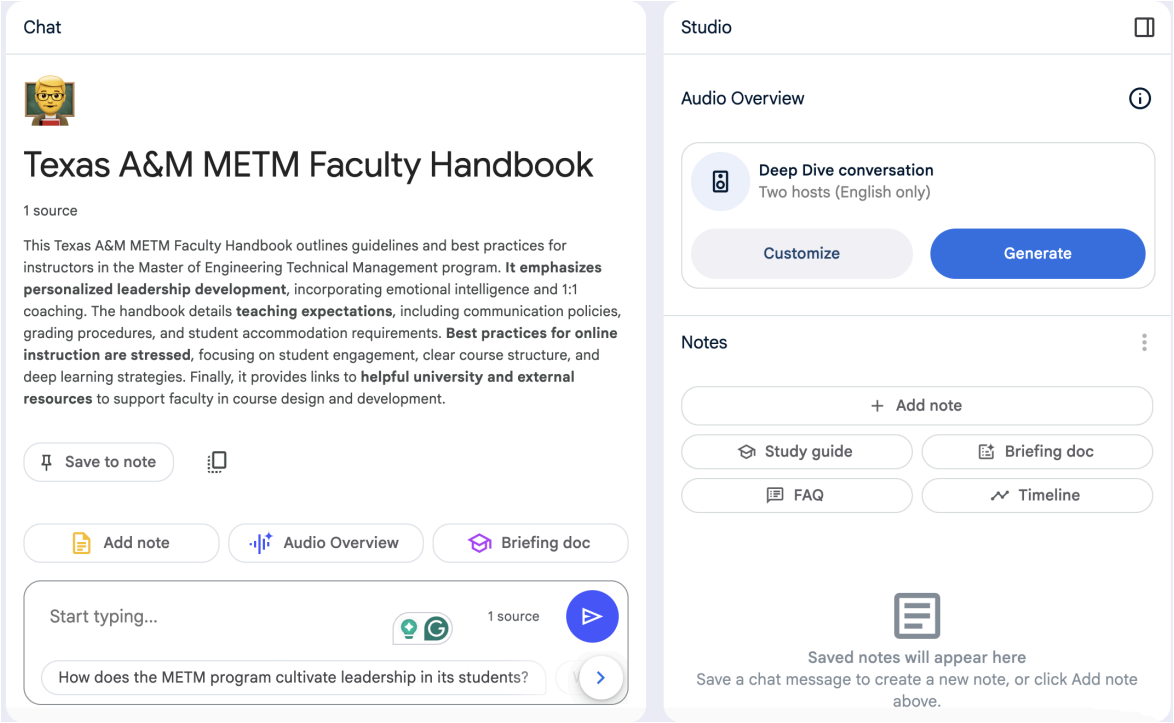

Figure 3. Google Notebook LM user interface with knowledge base uploaded.

User Testing

The researchers followed the steps laid out in the previous section to train Google Notebook LM with its knowledge base documents (i.e. METM Faculty Handbook, plus additional questions raised by faculty members).

Initial testing

Before sending it to faculty for user testing, we asked a few questions to see how good the answers this AI Assistant can provide (due to page limit, the complete script is not included in this paper).

"When should my class have final exam?"

NotebookLM gave pretty good answers, it was able to cite the METM Faculty Handbook sections and point to external resources, such as the university academic calendar.

"As a new faculty, what is my success criteria? How will my work be evaluated?"

NotebookLM's answer was acceptable and grounded within the Faculty Handbook document, but could be improved by directing faculty to the overarching goal of the

Program-level Learning Objectives and Course-level Learning Objectives, as well as the outcome of students' assessments (exams, quizzes, etc,)

Do I grade my own course work?

NotebookLM was not able to provide course-specific answers, because for some METM courses, faculty would grade assignments and there are no TA to grade, but some do.

Who should I talk to on this question?

As a follow-up question, it provided a very clear answer with the correct person to contact.

Who should I contact regarding travel expenses?

NotebookLM responded that "The sources do not mention travel expenses or who to contact about them. You should ask Dr. Wei Lu, … Dr. Lu is your point of contact for various faculty responsibilities, and this would likely fall under their purview or they could direct you to the appropriate person." Although this response gave a feasible solution (i.e. an indirect contact person), it can be improved so that a direct contact is pointed out.

Whenever the response was good, a thumbs up was rewarded to let NotebookLM know that it should respond in the same way next time this question is prompted. And whenever a response needs to be improved, we collect the question into a separate document (named "Additional New Faculty Questions"); then, group them, and compose the best responses for them. Next, the "Additional New Faculty Questions" document was uploaded as a supplementary knowledge base document, which includes the questions NotebookLM did not answer well during the internal testing phase.

Faculty Testing

In this step, the authors invited METM faculty to interact with this NotebookLM space by asking questions that a new faculty could have. The faculty recorded questions and answers and shared with the researchers, a brief interview was conducted to discuss the experience of that interaction (due to the page limit, the script is not included in the paper). Based on the feedback, a third document, "More Q&As", was added into the knowledge base to further improve its answers. In the next section, their first-hand experience of the tailored support is discussed.

Discussions

Faculty Experience

The link to the NotebookLM is shared with a faculty volunteer: instead of "Editor", faculty was assigned as "Viewer" to limit the type of interactions to asking questions, and viewing existing sources and notes, as well as generating Q&A, Briefing document, etc., to avoid further editing to the knowledge base. The researchers interviewed the faculty with the following questions:

- Could you please tell me your first impression? Is this tool easy to use?

Faculty mentioned that the tool is very easy to use, and responses were given instantaneously; but sometimes, it does not have an explicit answer, so it came up with a few suggestions. Another challenge is that the administrator of this tool will not see others' chat history automatically, which requires additional steps to share the interaction process and feedback to the admin, such as copy and paste the chat history and save into a separate document.

- How likely would you use this tool once we improve it, retrain it by feeding it with more relevant information?

Faculty's answer was "Absolutely yes, I can see myself using it. Because one of the challenges we have in our program is our professors teach once a year … and then for the next eight months…they will forget all this.". The particular nature of their teaching schedule makes having an additional tool to refresh their memory easier to do.

Limitations

Limitations of this study include the following: At the time of research, we had only recruited two faculty members to be involved in this experiment: one provided additional questions and one tested out this AI Assistant; thus the user experience data is limited. Although NotebookLM is easy to interact with, it requires a Google account in order to proceed. The chat history is not recorded automatically, thus it is important to have faculty keep a copy of the questions and responses and share with the authors, in order to make sense of how to further improve the tool. Furthermore, not everyone has become used to generative AI technology, due

to different reasons such as learning curve, concerns over data privacy, and potential technical issues that might occur during the process.

Conclusion

Customer service chatbot is not a novelty in consumer space; but, it has not been considered within the academic environment to provide support to new faculty members, not at the institutional or organizational level of where this research is taking place. AI engines can intellectually identify and group questions into certain categories (e.g. curriculum-related, pay-related, etc.), and provide the best answer, when prompted with natural language. With the help of an Artificial Intelligent Assistant, we expect to tackle the weaknesses and challenges of the current faculty support mechanism: an assistant who can quickly interpret various questions and provide immediate answers or point them in the right direction, so that faculty can receive on-demand support that is customized to their unique needs in a self-paced, protected environment. However, this AI Assistant is not to replace the human interactions between faculty and diverse university functions, but to facilitate further in-depth, meaningful conversations.

Comparing to traditional methods, such as making a call, sending an email, or looking through documents in possession, the AI Assistant generates correct responses immediately- the time-saving and autonomous self-support can be very impactful to a new faculty's teaching journey, with less wait time and frustration, they can focus more on cultivating future leaders with their expertise and experience.

Using tools such as Google NotebookLM to create a virtual assistant to quickly answer faculty's questions can be powerful for growing academic programs or departments in terms of meeting the increasing demand of faculty support and relieving the "bottleneck" caused by limited staff support; it relieves the anxiety of unknown in industry experts so they can focus on the more important tasks in their teaching career. The process and result discussed in this study can also be applicable to any small-sized organizations that rely on limited employee support resources or human-based onboarding processes, as well as those who can benefit from being able to nimbly update training documents and provide timely and customized responses to inquiries.

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