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The AI Chatbot Application for the ICDSE Online Learning Program – Implementation Paper

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The Institute for Capacity Development Strategic and Evaluation (ICDSE) of the International Monetary Fund (IMF) and Its Mandates

The ICDSE is the International Monetary Fund (IMF) functional division, part of the ICD department. As the umbrella organization, the IMF or the Fund mandates ICD to work with 189 member countries around the globe to strengthen their economic institutions by providing technical assistance and training on macroeconomic issues, helping the countries progress toward the Sustainable Development Goals (SDGs).

The ICDSE is the ICD division that oversees the Fund Capacity Development Governance. In collaboration with other ICD divisions, the ICDSE's mandates relevant to this paper are to lead on developing and updating the Fund's Capacity Development Strategy Review (CDSR), to coordinate the Fund's budgeting and planning cycle to facilitate improved prioritization of the CD funding, oversees the policy framework and practices for assessing CD projects, using the Result-Based Management (RBM), and to implement the Capacity Development Management and Administration Program (CDMAP) – a system that aims to make CD administration more efficient and provide accessible information on CD plans, budget, and results to various stakeholders.

The ICDSE develops policies and procedures for the mandates mentioned above to enhance the impact of the Fund CD and increase the efficiency of CD processes and systems, the RBM, and CDMAP. The RBM and CDMAP are the systems the Fund uses to manage the administrative and analytic aspects of the CD process, implementation, and results. Subsequently, project managers who are economists and in charge of each CD-related mission must use CDMAP (and RBM) as their go-to systems. ICDSE is expanding ways to educate these

project managers to use the systems via the CDMAP e-learning courses, which will be the focus of this implementation paper.

The CDMAP E-learning Program

The CDMAP e-learning program was officially established in the fall of 2023 with courses aimed at training project managers on six important cycles: project design and costing for direct delivery, project design and costing for non-delivery, project execution, project monitoring and assessment, project closing, and project reporting. It is recommended that courses be taken sequentially; however, for experienced CDMAP users, the courses may be taken individually based on one's desired focus area. Nevertheless, it is also strongly recommended that CDMAP users take CDMAP Overview before taking any project courses.

The course materials are authored using the web-based Articulate 360. The length of duration of each course is varied, ranging from one to three hours per course. Participants can take the courses in multiple sittings. At the end of the course, participants will receive a certificate of completion.

The E-learning Users and Application Settings

The users of CDMAP e-learning are project managers from across the CD department in the Fund and training centers around the world. The CDMAP e-learning is module-based and self-directed. The CDMAP for project managers course series serves to equip managers who work on CD projects with the skills and knowledge needed to successfully manage a project in the CDMAP system through the project life cycle.

The Challenges of the CDMAP E-learning

There are challenges within the newly implemented e-learning programs. The only means of communication between the participants and the e-learning program is to communicate via internal email to the assigned CDMAP e-learning email group, which includes the project support coordinators. The incoming emails would go to the inboxes of the individuals in the CDMAP e-learning email group. Each individual in the email group would then provide any responses depending on the needs of the participants' emails.

It may be manageable now for everyone in the email group to keep up with the incoming emails seeking assistance related to CDMAP e-learning. However, as more modules are added, the potential questions from participants could be overwhelmingly cluttering the individual inboxes of the people in the CDMAP e-learning email group to keep up. Subsequently, it could create inefficiencies in providing feedback and guidance.

The mission of CDMAP is to provide information, guidance, and training to project managers of the larger divisions in the IMF HQs and training centers around the world. The one issue with the training program is the volume of questions received as the program grows with more e-learning materials added. To remedy this challenge, the program will put a chatbot in place.

The Proposed Application: The Artificial Intelligence (AI) Chatbot

The application proposed for ICDSE CDMAP (and the future RBM) e-learning is an AI chatbot. A chatbot is an artificial intelligence (AI) software designed to stimulate and engage in conversation with human users (Lasky, 2023). Chatbot-like technology was first introduced by Alan Turing in 1950—and AI-integrated technology followed in the late 1980s. In the 21st

century, AI-integrated technology can be found in many virtual assistant applications such as Apple Siri, IBM Watson, Google Assistant, Microsoft Cortana, Amazon Alexa, Facebook Messenger, and WhatsApp. People converse with these apps daily for a variety of purposes. People can ask about the weather or current news, request songs, seek online order status, send text messages, pick and play songs for us, serve as a timer, and many more.

According to published research on the number of digital voice assistants in use worldwide from 2019 to 2024, there were about 4.2 billion digital voice assistants used in devices worldwide. It is estimated that in 2024, the number will increase to 8.4 billion ("Number of voice assistants in use worldwide 2019-2024," 2020). In an era where people tend to have more to do than time, immediate response and assistance become the new expected outcomes.

For educational purposes, AI chatbots serve as virtual assistants, as previously mentioned, learners' instruction aids, paper assessments, curriculum updates, and admission process support. MIT, Stanford, Georgia Tech, and the University of Oxford are the few big educational institutions that work expansively integrating AI into their academic programs.

The First Justification: Administrative and Communication Assistant

The first and most crucial justification for using an AI chatbot is that it can assist and respond to real-time inquiries. Currently, any inquiries are addressed by project assistants to respond to the inquiries via email. Chatbots can engage, communicate, and provide real-time answers to human users' questions. AI chatbot would be a great addition to CDMAP online learning as it could enhance efficiency and increase learning delivery and experience. AI integration is beneficial as a distance learning assistant that can provide administrative and

learning assistance. For the same reason, it would also be a great addition when RBM online learning is soon released.

The Second Justification: Fifth-generation Technology Expansion

The second justification is that ICDSE would want to expand its use of fifth-generation technology for distance education other than the Internet, the World Wide Web, and open-source systems. Although chatbot-like technology started in the 1950s, its capabilities have expanded significantly. AI technology is not only integrated for consumer use but also in fields such as marketing, supporting systems, health care, entertainment, cultural heritage, and education -traditional and non-traditional.

The Third Justification: AI as a Tool for Designing and Delivering Learning

As AI technology advances, many business sectors integrate it for enhancement and expansion purposes, including for educational purposes -designing and delivering learning. For example, edX has integrated an AI application similar to chatbot ChatGPT into its platform. The goal of AI integration to the edX platform is to “leverage the technology of AI research… and to deliver real-time academic support and course delivery to help learners achieve their goals” (“edX debuts two AI-powered learning assistants built on ChatGPT,” 2023, May, para 1).

AI technology can be designed to become an automated teaching assistant to answer students' questions in distance learning. An example of a computerized teaching assistant is “Jill Watson,” piloted by the Georgia Institute of Technology (Goel & Polepeddi, 2016, as cited in Chen et al., 2022, p. 163). AI chatbot integration can be a pilot project for the ICDSE online learning program moving forward. Its potential success could set a baseline guidance for other online learning programs at the IMF.

The Benefits of AI for Education and Corporate Learning

The benefits of AI for educational purposes, including CDMAP (and RBM) online learning, are 1) 24/7 quick accessibility with automated virtual support that provides accurate answers; 2) social interactions with chatbot increase learner engagement; 3) personalized learning and progress, tutoring systems, and time management skills; 4) automated administrative support, such as admission, course details, organizational update, and customized recommendations based on learning history; 5) multi-languages support capabilities; 6) improved feedback collection via chatbot-driven survey; 7) cost saving; 8) wide range of resources access; and 9) data collection and analysis, leveraging chatbot data (Mallow, 2023; Selvaraj, 2023).

Literature Review

Artificial Intelligence (AI)

Artificial Intelligence is “machines that respond to stimulation consistent with traditional responses from humans, given the human capacity for contemplation, judgment, and intention” (Shubhendu & Vijay, 2013, p. 28). In their research, Shubhendu and Vijay state that today, “AI can make decisions which generally require [a] human level of expertise” (2013, p. 30). West and Allen of the Brookings argue that “AI enables people to rethink how we integrate information, analyze data, and use the resulting insights to improve decision-making” (2018).

Chatbot in E-learning

Chatbot for the educational sector offers academic assistance to higher education students by providing real-time and correct responses. Chatbot for educational purposes uses Natural Language Processing (NLP) methods. The NLP is a form of Artificial Intelligence (AI) that

allows computer programs to “understand human languages as it is spoken” (Hussain et al., 2023, p. 1).

Design of a Chatbot as a Distance Learning Assistant

The EconBot is a chatbot virtual assistant designed by the Universidad Nacional de Educación a Distancia or the National University of Distance Education (UNED) in Spain since 2017. The EconBot is used in teaching and learning an Introduction to Macroeconomics. At the UNED, EconBot provides “administrative knowledge, basic concepts of Microeconomics, and Macroeconomics Fundamentals” (Tamayo et al., 2019, p. 151).

Chatbot Development as a Digital Learning Tool to Increase Students’ Research Knowledge

Integration of chatbots in education and training benefits student engagement in learning. Chatbot supports the learning process by making learning more fun, engaging, and entertaining; Chatbot increases student engagement in learning, concurrently facilitating the teaching process by reducing teachers’ time to respond to repetitive questions and act as a virtual assistant (Singh, 2018; Garcia-Brustenga et al., 2018, as cited in Vanichvasin, 2021).

The advantages of using chatbot technology include low cost, real-time answers to queries, better interaction, creative learning, improved efficiency, 24/7 support ability, and to give access to learning content (Llic & Markovic, 2016; Bii, 2013; Garcia-Brustenga et al., 2018; Winkler & Sollner, 2018, as cited in Vanichvasin, 2021).

Chatbot also helps teachers or instructors by providing a collection of asked questions, which teachers or instructors can then modify and expand knowledge based on the collected information from the chatbot (Vanichvasin, 2021).

Exploring the Potential Impacts of Chatbot Software/Apps (ChatGPT) on Education: Benefits, Drawbacks, and Future Prospects

The benefits of chatbot software are a tool for learning and education, a tool to increase student engagement, a tool to provide intelligent and real-time feedback, a tool for a tutoring system, and a tool for student companions (Rathore, 2022).

However, arguably, chatbot software also has its disadvantages, namely diminished personalization that humans can provide; diminished understanding because chatbot is designed with a pre-set algorithm and programmed to respond to specific keywords and phrases; tech problems, such as software bugs, server outages, or network problems; potential high cost of chatbot software creation and maintenance (Rathore, 2022, pp. 43-44).

Deploying Chatbots Brings Many Challenges

The advancement of AI chatbots in the past five years has prompted many people to interact with the application. Despite the advantages, chatbots also come with some challenges. The journal article by Schuetzler, Grimes, Giboney, and Rosser (2021) provides some recommendations for better deploying chatbots, namely 1) do not deceive customers, 2) use cues to make the conversation feel natural, 3) consider the limitations of chatbots, 4) provide prompts to show customers what the chatbot can do, 5) equip the chatbot with the ability to handle small talk and probing behaviors, and 6) for customer service chatbots, provide a way to connect to a human (Schuetzler et al., 2021).

AI Chatbot Virtual Assistant (VA): CDMAP-Bot Introduction to ICD and ICDSE

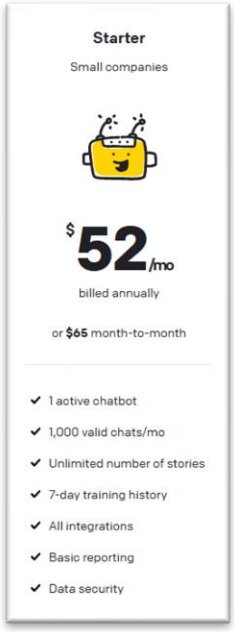
Since CDMAP online learning was newly introduced in the fall of 2023, the objective of implementing an AI chatbot CDMAP (and future RBM) online learning is to serve as an automated virtual assistant. The AI chatbot communicates with learners who seek information about CDMAP online learning, such as the course, access, registration, content, and results.

The Chatbot Starter Plan, Pricing, and Features

As this pilot project is still in its early stages, the proposed chatbot plan is the Starter plan. The plan costs $52/monthly, billed annually. Image (1) displays the features included in the Starter plan. The features included in the plan are 1) one active chatbot; 2) 1,000 valid chats/per month; 3) an unlimited number of stories; 4) a seven-day training history for the chatbot to recognize unmatched queries; 5) all integrations; 6) basic reporting; and 7) data security with secure 256-bit SSL encryption for web visitors and users who connect with the chatbot (*"Chatbot pricing*," n.d.). A valid chat is a chat that has at least one interaction. Over the quota, a valid chat will be charged $0.01/valid chat.

Image 1.

Chatbot Starter Plan, Pricing, and Features



Source: Chatbot.com

Table 1.

Specification in Choosing AI Chatbot VA for CDMAP Online Learning

Proposed AI chatbot platform	• Chatbot
Proposed plan and pricing	• Starter plan • $52/monthly – billed annually
Purpose	• Automated VA
Target audience	• CD Project Managers
Stakeholders	• ICD Management • ICDSE Management • CDMAP Business Support team

	• ICD Operational Management division
Chatbot key features	• AI • Integration options • Customization option for future expansion as online learning expands • No coding is necessary, yet it remains user-friendly • Pre-populated templates availability • Analytic and reporting for decision-making and improvement
Conversational scope	• Courses • Access to the courses • Registration • Contents • Result of learning
User experience (UX)	• Intuitive navigation • A clutter-free layout • Visually attractive design
Platform integration	• Embedded into the IMF Intranet site • Embedded into Microsoft Teams • Integration with MyIT Helpdesk or Service Hub for ticketing systems for complex queries to receive human agents' assistance
Response time and accuracy	• Real-time and accurate responses
Multilingual support	• English only (for now)
Privacy and security	• Compliance with the Fund data protection standards and regulations
Branding capabilities	• The IMF branding and logo

Source: Chatbot.com

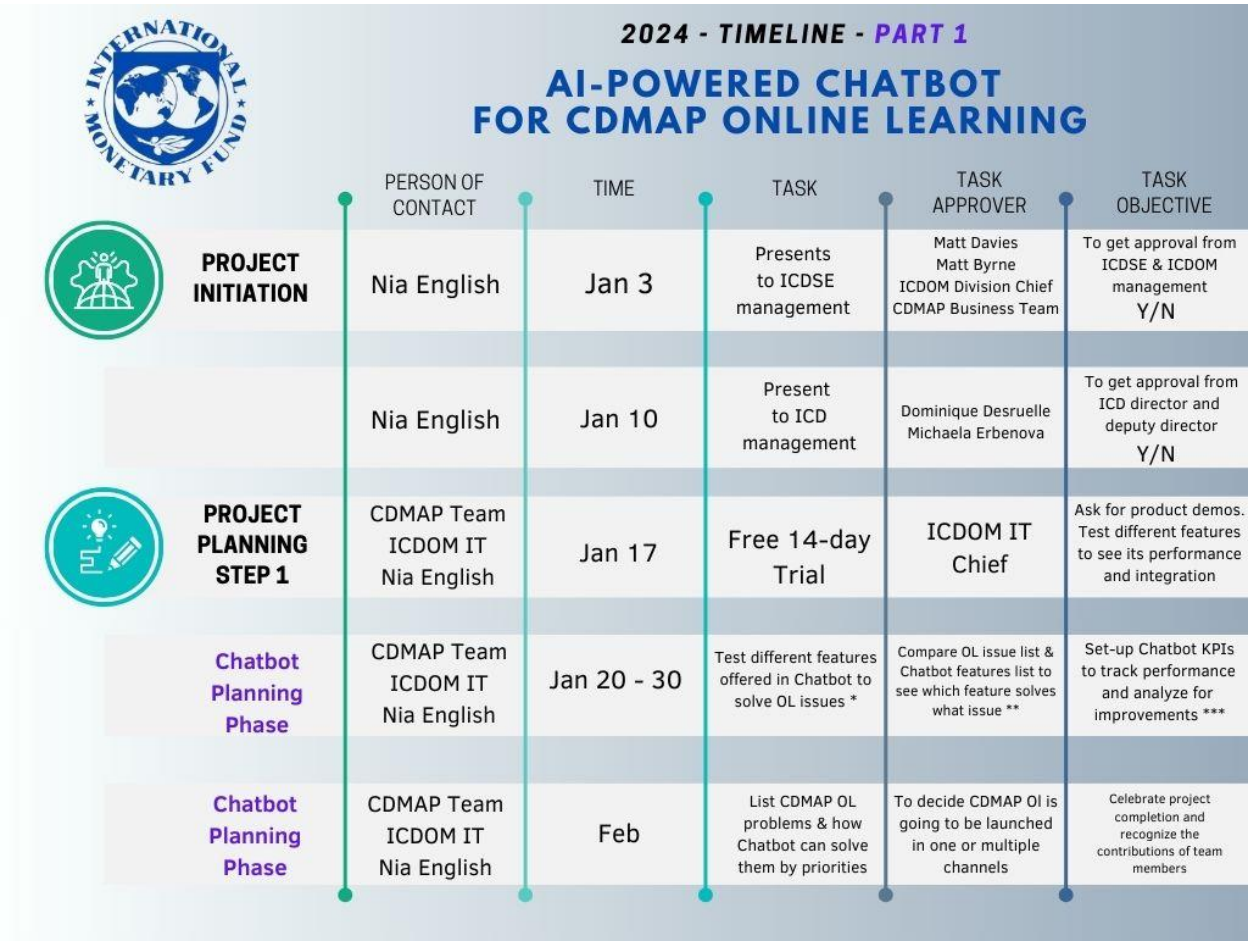
Timeline

The proposed timeline would start at the beginning of 2024, from January to April. The goal is to receive clearance from the ICD director and deputy director, ICDSE management, and ICDOM management by the end of April. Furthermore, following the clearance, the goal is to purchase the Starter Plan AI-powered chatbot to be integrated into CDMAP online learning.

It is important to note that during the monitoring phase, the team will monitor how the designed chatbot responds to questions from actual learners and/or CDMAP and ICDOM-IT teams. The gathered data throughout the project planning phases – planning, building, and monitoring, would be the baseline to alter the overall design of the chatbot. The detailed timeline is conveyed in Figures 1 to 4.

Figure 1.

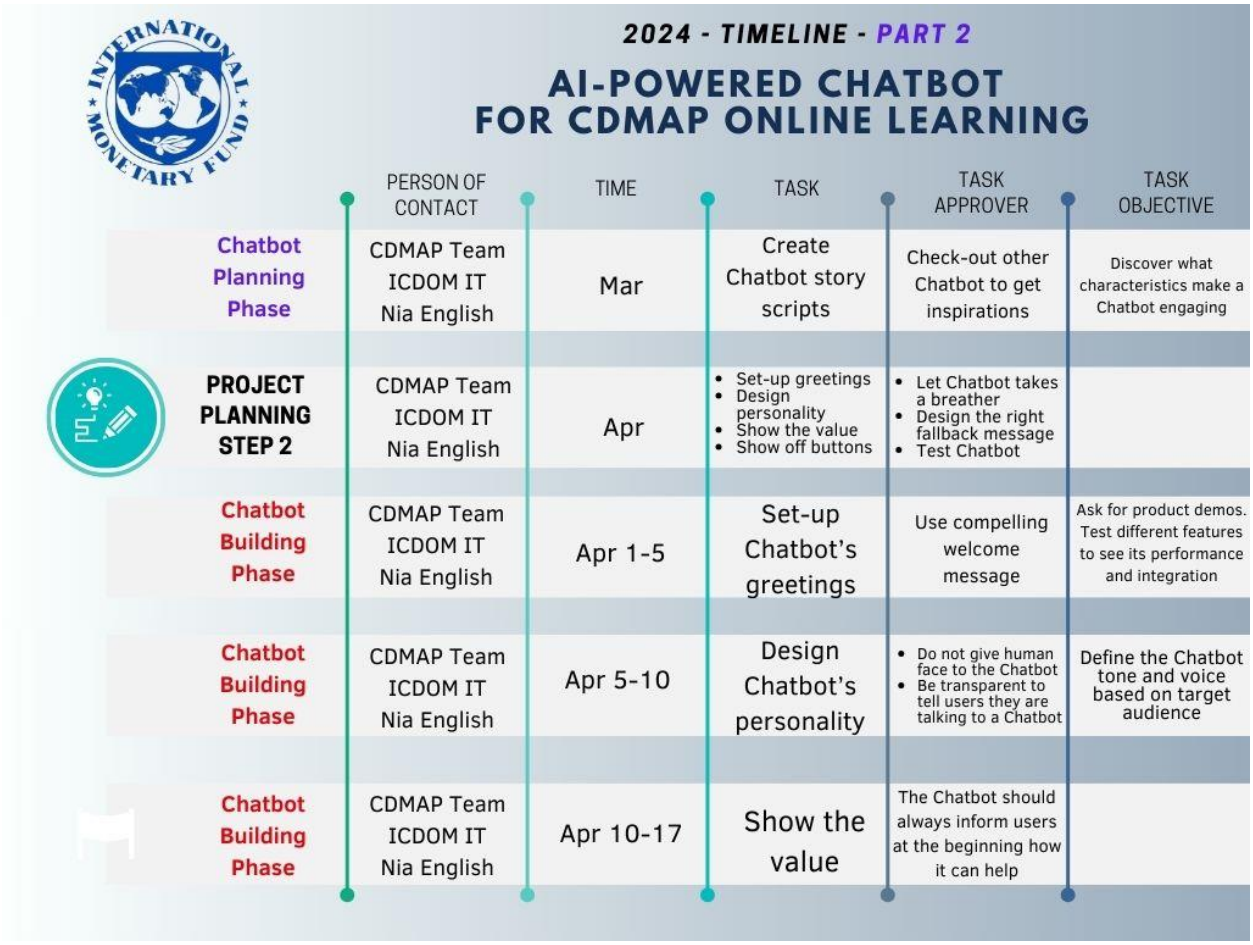
Timeline – Part 1



Source: Chatbot.com

Figure 2.

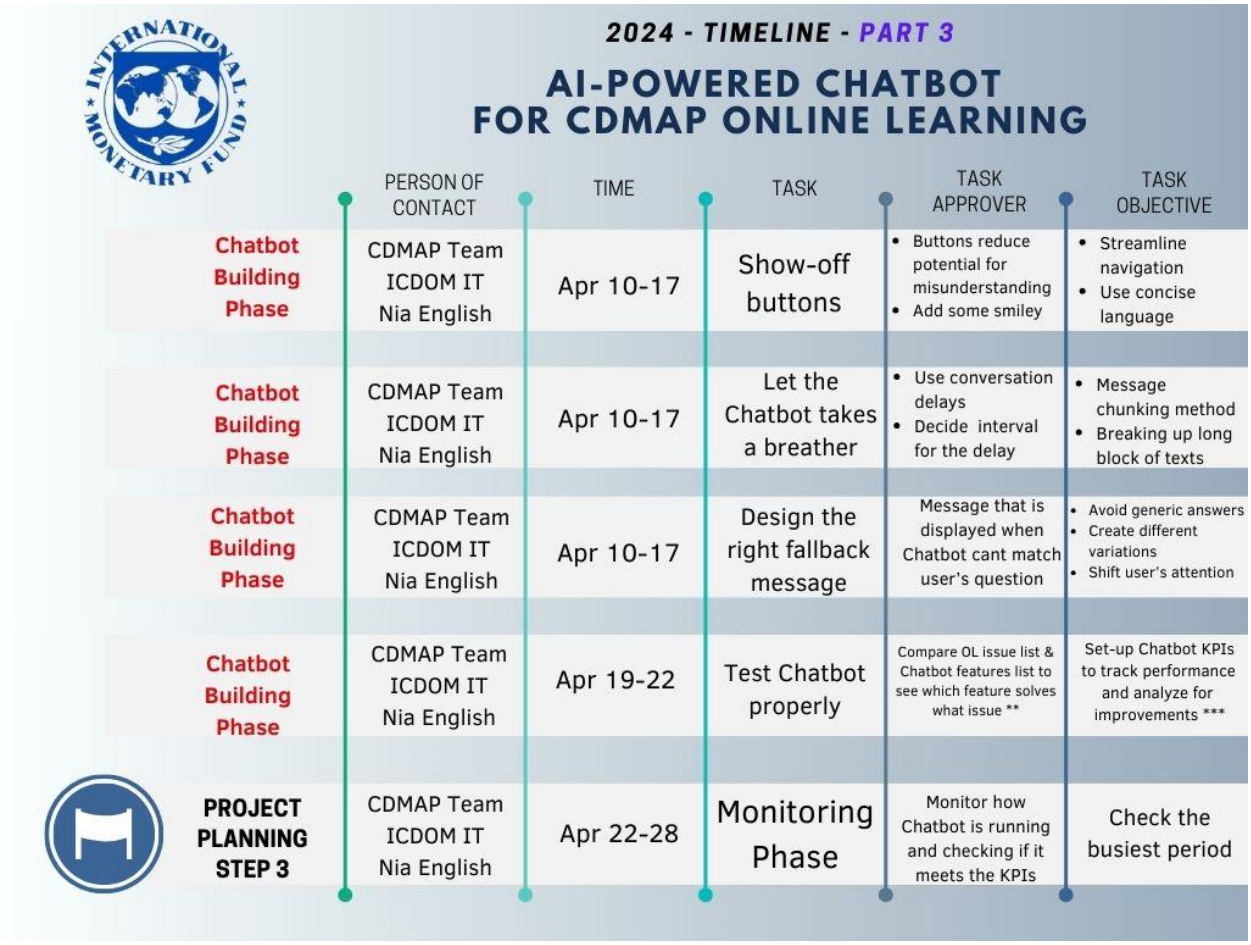
Timeline – Part 2



Source: Chatbot.com

Figure 3.

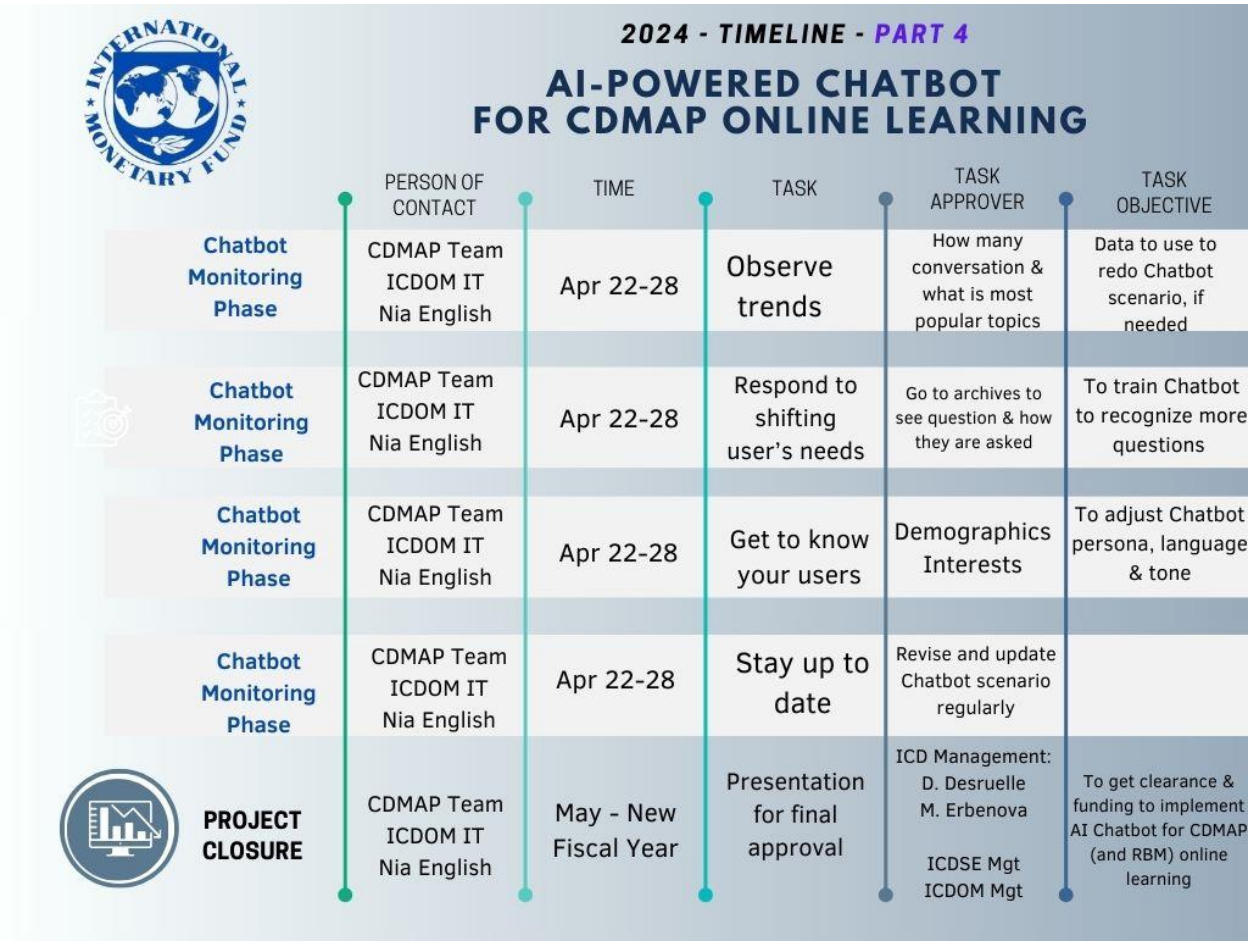
Timeline – Part 3



Source: Chatbot.com

Figure 4.

Timeline – Part 4



Source: Chatbot.com

Potential Resistances

The potential resistance to integrating AI chatbots into CDMAP online learning would be privacy, longevity, and intellectual property. The resistance to AI integration into CDMAP online learning comes from the concern that AI technology is still evolving. The acceleration of technological development has posed multiple challenges, while policy and regulatory frameworks to address these advancements tend to be on a much slower pace.

The 21st century is the era of digitalization and information. Some technology has advanced significantly in the past few years, including AI-powered technology. For example, when ChatGPT was released, some public schools and higher education institutions banned the use of ChatGPT. It is expected that people tend to be reluctant to change; nevertheless, despite society's readiness, AI-powered technology is here to stay.

Solution

To mitigate the risks and challenges of the AI-integrated chatbot in the CDMAP online learning program, it is essential to strengthen the security surrounding the designed CDMAP-Bot. The recommended steps to enhance security for CDMAP-Bot can be done by 1) implementing end-to-end encryption, two-factor authentication, biometric authentication, and authentication timeouts; 2) running Penetration Tests and API security tests; and 3) staying updated with the latest developments in chatbot cybersecurity ("Chatbot Implementation – 15 Tips for Success," n.d.). A continually evolved cooperation amongst the management, IT department, CDMAP team, and other stakeholders, as the online training expands, is crucial to safeguard any potential risks and challenges. Another solution is to collaborate with the ICD Generative AI Working Group, which works closely to explore ideas of AI as part of the IMF AI Coordination Committee.

AI Chatbots Weaknesses and Solutions

AI technologies are still evolving; however, AI chatbot has weaknesses. According to Eleni Adamopoulou and Lefteris Moussiades, the weaknesses of chatbots are 1) failure in intent understanding; 2) toxic content in chatbot's user inputs; 3) deception towards chatbots; and 4)

long replies, misused phrases, lousy intonation, poor pronunciations, speech impairments, syntax errors, slang words, lack of personality, and lack of clear chatbot strategy (2020, p. 13).

The Proposed solutions

To mitigate the failure in intent understanding, it is essential to monitor chatbots, as mentioned in Figure 4 (Timeline – Part 4). During the monitoring phase, the CDMAP team, in coordination with IT, would observe trends during busy periods to learn about popular topics from chatbot chats, respond to shifting users' needs by going to archives for more data to retrain chatbots to recognize more questions, get to know the users' demographics to adjust chatbot's persona and tone of language, and finally to stay up to date by revising and updating chatbot scenario regularly.

Furthermore, to mitigate toxic content, "a solution based on homomorphic redaction, for the secure handling of Personal Identifiable Information… this approach creates defenses for chatbots" could be implemented (Adamopoulou & Moussiades, 2020, p.13). It is also vital that the chatbot gives concise messages. Spell checkers would be helpful to reduce long sentences that would confuse the chatbot in responding. For lack of personality, a continuous update on the chatbot's persona, tone, language, name, and avatar would create better chatbots.

Conclusion

To sum up, since its first inception, CDMAP online learning's biggest challenge is to have a support system that can assist project managers in having a good learning experience. To date, project managers around the world who have to take CDMAP online learning must send emails to the CDMAP team to get any assistance. It may be doable now since CDMAP online learning has only released two modules. However, since there will be more modules to be uploaded, in

addition to the release of RBM online learning soon, it is expected that there will be more questions arise from the learners.

To solve the problem, ICDSE ought to harness AI chatbots to deliver its CDMAP (and RBM) online learning program because, despite some drawbacks, AI chatbots make the overall learning process more efficient and productive. AI chatbot virtual assistant would improve ICDSE's ability to respond to inquiries about online learning, whether it is administrative or content matters.

With CDMAP-Bot, project managers can have 24/7 access to support and guidance. This particular benefit is significant as ICDSE online learning serves project managers worldwide with diverse time zones. The ability to respond on time would reduce unnecessary frustration by the learners. Real-time assistance would increase motivation and engagement with learning, too.

AI technologies are revolutionizing the way businesses are conducted. The acceleration of AI technologies opens many possibilities, including efficiencies across disciplines. Regardless of some drawbacks, in less than a decade, AI-powered chatbots have found their place in day-to-day life in many shapes or forms, and it is here to stay.

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