AI CHATBOT TO TEACH MICROSOFT EXCEL

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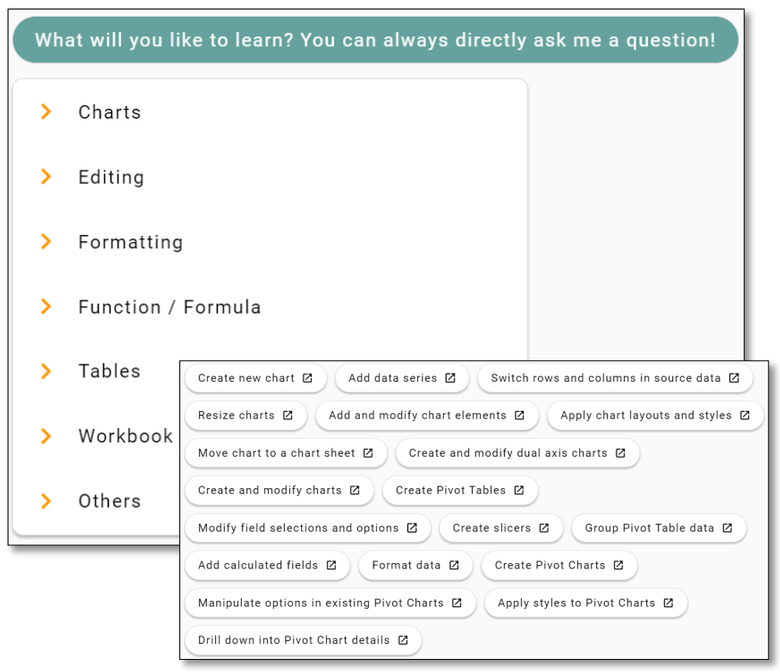
Background

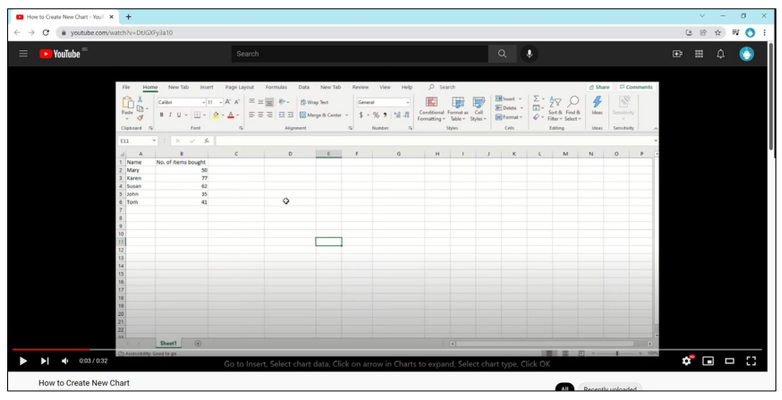
At Temasek Polytechnic (TP), the FLEX Week, an independent learning week, provides students with opportunities for competency development and enrichment beyond the classroom. Due to the COVID-19 pandemic, many of these face-to-face workshops had to move online. In early 2021, TP embarked on a Digitalisation Plan which included Digital Learning. Students could learn in a highly flexible, personalised, self-regulated manner to achieve better learning outcomes. The School of Informatics and IT (IIT) partnered the School of Applied Science (ASC) and School of Engineering (ENG) to develop an Artificial Intelligent (AI) Chatbot using Google Dialogflow to act as an online teaching assistant. It was used to guide 250 first and second year ASC students from the Diploma in Chemical Engineering (CHE) to learn Microsoft Excel during their FLEX Week which was from 19 to 23 July 2021. The Chatbot was designed to help them acquire the skills to pass the Microsoft Office Specialist Excel 2016 certification exam. This study aimed to find out how the students tapped onto the Chatbot technology for learning. Their usage patterns were studied by looking through the Dialogflow logs. Data from two surveys data revealed the students' learning traits. The findings will help inform the design of chatbots for Self-Regulated Learning (SRL). Funding for this project came from ASC Student Project Fund and TP Research Fund (January 2021).

What The Chatbot Does

- Operates through a web application
- Tracks users to perform learning analytics
- Provides a menu listing the examinable objective domains for certification



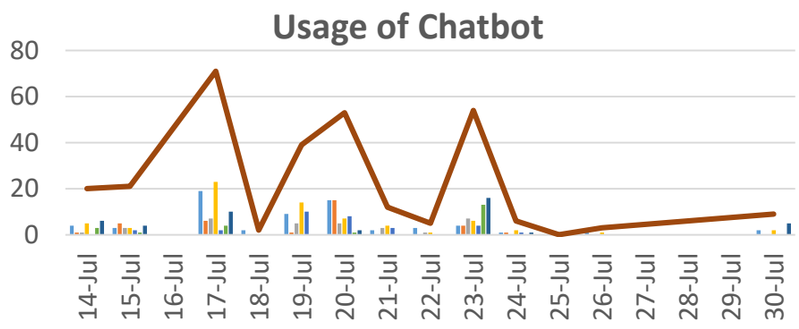
- Demonstrates application of principal features through 149 one-minute video lessons



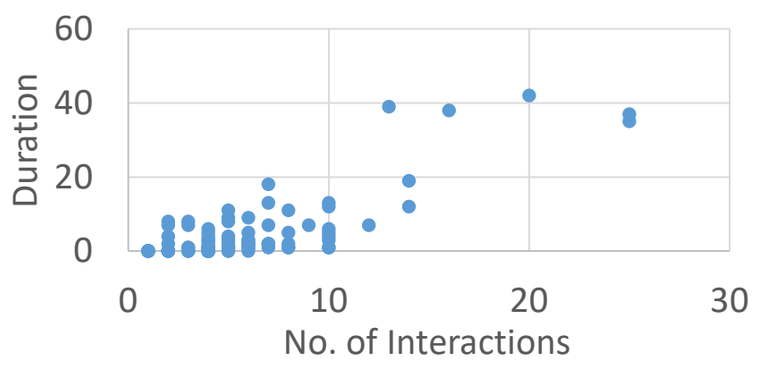
- Responses to free-form technical queries but not those with emotional intents
- Displays just-in-time content answers to student questions

How Students Used The Chatbot

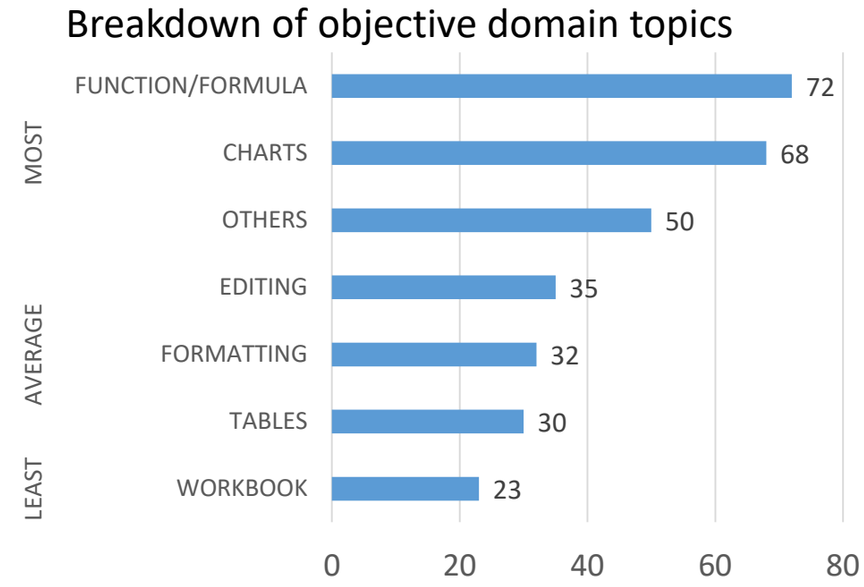
- Accessed mainly through laptop
- Observation period: 14 Jul - 20 Aug 2021
- Usage peaks: launch, mid- week, & workshop cum competition



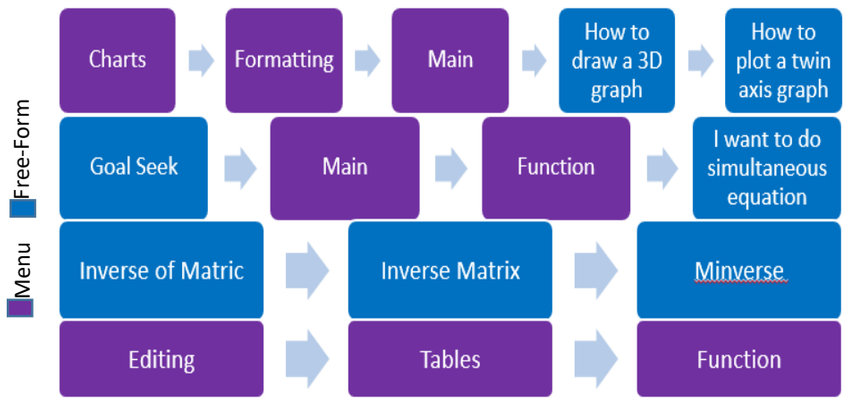
- Preferred menu (90%) over free-form (10%)
- From 4 to 10 questions, up to 18 mins



Breakdown of objective domain topics



- 39% displayed self-regulated strategies by zooming into particular objective domain topics; the rest were 'window-shoppers'.



Key Design Enhancements

- Provide short responses so that users accessing through smaller screen devices can view the text clearly
- Use animated responses (screenshots showing a sequence of steps into a Graphics Interchange Format) to replace text-based answers
- Provide access to a human agent through automated email notification when any intent is not recognized
- Include an activity for the users to articulate the purpose of learning from the bot to help them draw the learning roadmap to enhance self-regulation
- Assess the prior knowledge for the bot to provide scaffolds by recommending learning tasks that matched learners' prior knowledge and organised in order of increasing difficulty

Conclusion

SRL is where "the learning task can be set by the teacher" (Saks & Liejen, 2014, p. 192) to direct the learners how to initiate the learning task and decides how learning is best accomplished.

For educational AI chatbots designed with a SRL framework, learners need to be supported on how they should execute their learning tasks while still providing them the autonomy.

Furtherwork: To use learning analytics to understanding student learning through their chatbot interactions.

Reference

Saks, K. and Leijen, A. (2014). Distinguishing Self-Directed and Self-Regulated Learning and Measuring them in the E-learning Context, Procedia - Social and Behavioral Sciences, 112, 190-198.

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