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Integration of Chatbot with your course

Dr. Alireza Kavianpour, DeVry University, Ontario,CA

Dr. Alireza Kavianpour received his PH.D. Degree from University of Southern California (USC) in the field of Electrical and Computer Engineering. He is currently Senior Professor at DeVry University, Ontario, CA. Dr. Kavianpour is the author and co-author of over sixty technical papers published in IEEE Journals/Conferences.

Integration of Chatbot with Your Course

Abstract

This paper discusses the integration of chatbot software in the courses with the Canvas platform. Chatbot is a software application that can simulate human conversation and enhance teaching. A teacher's time and his presence in the classroom is limited; however, this application software offers new ways to make a teacher's presence and his knowledge to be available more often. Chatbot can be used as a tool for teaching and learning. It can be used to answer many students' questions such as: exam date, office hours, searching content of a chapter of the textbook, holidays, and many more.

In this paper several features of chatbot and student utilization of the chatbot will be discussed.

1- History of chatbots

A. Turing in his 1950 paper, explains that a computer program can simulate human behavior. He suggested a test program to prove his idea.

Dr. J. Weisbaum from Massachusetts Institute of Technology developed *ELIZA* in 1966. It is believed to be the first chatbot program. Input to this program was through a keyboard.

Dr. K. Colby from Stanford University in 1971 discussed the use of computers to analyze the brain of human beings. Later he designed a computer program for simulating a patient with a mental disorder.

R. Carpenter in 1988, created *Jabberwocky*. This program simulates human communication.

In 1992, *Creative Labs* developed an AI speech synthesizer program called *ALICE*.

Based on AOL *Instant Messenger* a program called *Smarter Child* was designed in 2001.

In 2010, Apple introduced *Siri*. Later Google introduced *Google Now* in 2012. *Cortana* by Microsoft and *Alexa* by Amazon were both introduced in 2014 [4],[5],[6],[7].

In 2016 Facebook social media offered its *Messenger* for chatbots. *Live Chat* released *Chatbot* in 2018. *Chatbot* helps users without coding to build a chatbot program.

2-Principal of a chatbot program

A chatbot program uses an algorithm like the one used in artificial intelligence (AI) [1],[2],[3] applications by exploiting text for human conversation. The main job of chatbot software is to response to student questions by bypassing teacher involvement. This software can communicate with several students at the same time. Chatbot can increase student participation. Chatbot can be integrated with Canvas websites, and other applications such as Zoom or Webex. It can be designed in two different ways; by using AI or by using pre-defined answers. Depending on what students are asking, chatbot can respond differently to each student. This will increase the sense of ownership of students. In addition, the responses of the students provide data for the teacher to get to know the student better. This allows the teacher to improve the interactions by adjusting the chatbot's design.

2.1-Chatbot Assistant in a Classroom

Chatbot could be very helpful in a classroom. The following are several areas that this software could assist.

1- As a **Mentor** by providing feedback.

2- As a **Tutor** by providing some personalized direct instruction and answering personalized questions.

3- As a **Coach** by providing opportunities for reflection.

4- As a **Teammate** in group projects, by providing alternate viewpoints and that will increase team's performance.

5- As a new freshman **Student**, by asking many primitive questions from the instructor. As the result instructor will be more prepared for the harder questions from other students.

6- As a **Simulator** in which students can practice their project presentations.

7- As a **Flashcard** for practicing and preparing for exam.

8- For collecting **Feedback** regarding lectures or course.

9- As a **Student Advisor,** by providing teaching plan, submitting course incomplete application form, registration, course progress, pre-requisite requirement, etc.

Creating these nine options requires several best practices to ensure that they are effective, ethical, and user friendly. You can also use multimedia to make them more interesting and interactive.

In this paper, the author will provide the structure of a chatbot. In a typical course website, an icon named "chatbot" could be added. Give your chatbot a **character** by assigning it a name. You should make the chatbot's purpose clear. Introduce the chatbot using a welcome message, a menu with one of the options 1 through 9 (as listed above), or a help button. Use humor, to make it more engaging.

2.3-Does chatbot replace the teacher?

The author believes chatbots will not replace the teacher, but it could be used as one more tool, or a new medium to extend the capacity and unique abilities of the teacher. The same way we use **PowerPoint slides** to share lectures with the students.

2.4-What's the difference between chatbots and bots?

The terms chatbot and bot are used interchangeably, but there's a significant difference between them. A chatbot is a computer program designed to communicate with users. It analyzes users' questions to provide matching answers. Businesses use chatbots to support customers and help them accomplish simple tasks without the help of customer service. However, a bot is an algorithm that interacts with web content. Bots help businesses and users by performing complex tasks faster.

2.5-Steps in creating a chatbot and the associated cost

Chatbots can be created by two different methods. In each method costs will be different. One method is from scratch and the second method is by using a chatbot platform.

(a)- Chatbot Design using a platform

Using a platform is the easiest way to create a conversational interface. Platforms are user friendly. They let you choose predefined elements to design chatbots and launch them without writing codes. To facilitate the building process, some platforms provide templates. Platforms also could be used for testing whether your business could benefit from using a chatbot. Some companies use chatbot platforms only during the shopping season. They use a chatbot to help support teams or promote their new products. Another advantage of platforms is integrating them with third-party services.

(b)- Chatbot Design using Coding

Building your own chatbot from scratch is time-consuming, but it gives you total control over your chatbot. You can customize your chatbot to serve the needs of your customers, configure it to solve complex problems, and integrate it with any platform you wish.

Costs associated with the design of a chatbot directly related to its functionality and its complexity. The initial cost starts at $50k.

2.6 The use of chatbot in education

With the advance in technology and the creation of social media, students' interaction with teachers has changed. Classroom interactions have been replaced by online conversation. This has forced universities to adapt to a new method of communication. To achieve success in students, universities need to provide online interaction. The more your school grows, the more complicated student service is. This is where chatbots become a valuable tool.

2.7-Challenges for chatbots

Chatbots have some limitations and are not error free. They are not able to handle **emotional** situations or **ethical** issues. However, chatbots also have some opportunities and advantages. They can enhance teacher's coaching or mentoring by providing additional support.

3- Implementation of Chatbot in a course

To encourage your students to use chatbot, in your course announce the following:

Chatbot Sample Announcement:

"Class, the chatbot is located on the home page of the course.

You can ask questions such as:

· When is my next live session?

· What are my assignments for this week?

· Did I miss any assignment submissions?

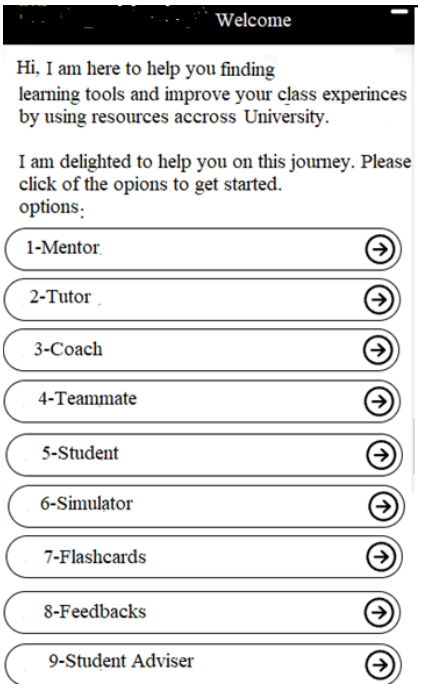
· What topics will this course cover?

· What is the link to online live lecture?

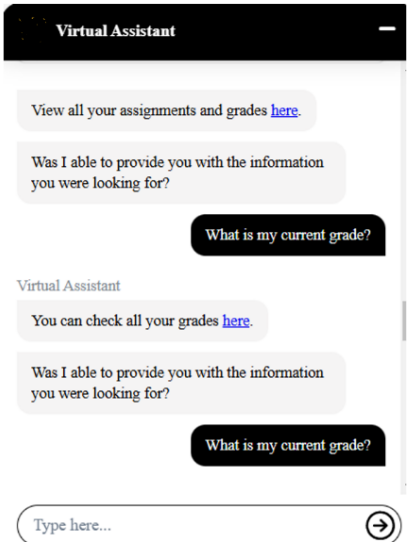
At the end of term, provide your feedback on improving the capabilities and user experience."

In the following, the layout of several examples of a chatbot will be discussed.

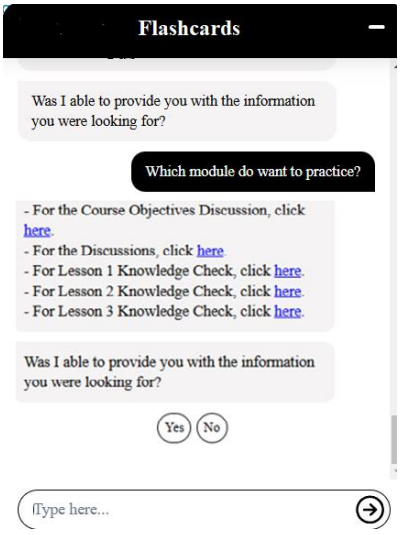
(a)- **A welcome message by chatbot.**



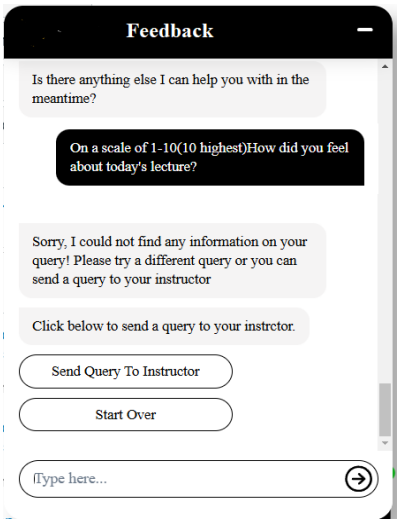
(b)-As a virtual assistant



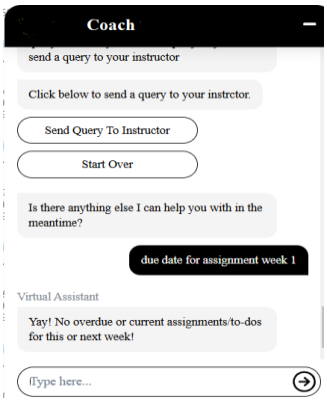
(c)- The use of Flashcards.



(d)- Collecting feedback by chatbot.



(e)- Coaching by chatbot.



4-Using chatbot as a tutor in programming courses

The following are a few examples:

(1) -Asking chatbot regarding the concept of **integer** and **float point** numbers.

Question: calculate the following.

(i) A=3*(5/3)

Chatbot answer: 3

(ii) B=3*(5.0/3)

Chatbot answer:5.0

Question: Why are the answers different?

Chatbot answer: The difference is due to the way operations are handled with different data types.

(2) -Asking chatbot regarding the concept of assignment (=) and comparing (==).

Question: For the *if statement*, calculate the result if the initial value of B is zero.

(i) *if (B=1)*

Chatbot answer: B=1

(ii) *if (B==1)*

Chatbot answer: Result is *False* due to comparing the value of B which is zero with "1".

Question: Why are the answers different?

Chatbot answer: The operator "**=**" means assignment and operator "**==**" means comparing two values.

(3) -Asking chatbot regarding the concept of loop.

Question: Consider ***for (; ; ;)*** statement: Is it a correct statement?

Chatbot answer: "***for (; ; ;)*** "is an infinite loop and it is not recommended.

(4) -Asking chatbot regarding the concept **pseudo** instructions.

Question: What is the difference between ***#define c 3*** and ***int c=3*** although both means ***c=3***.

Chatbot answer: ***#define c 3*** is a pseudo and *int c=3* as a real instruction.

(5) -Asking chatbot regarding the concept of **Global** and **Local** variables.

Question: What is the difference between ***EXTERN JOHN*** and ***AUTO JOHN***.

Chatbot answer: ***EXTERN JOHN*** is a global variable. Any changes to the variable **JOHN** will be transmitted to all blocks/functions using ***JOHN***. ***AUTO JOHN*** *is a local variable.*

(6)- Asking chatbot regarding the concept *Static* variables.

Question: What is the difference between" ***int c"*** and "***static int c "***?

Chatbot answer: Static variables are created once the program starts and holds value throughout the execution phase. The scope of ***int c*** is limited and is a local variable.

(7)- Asking chatbot regarding the concept of **Pointers**.

Question: Explain the difference between ***int c*** and ***int *c.***

Chatbot answer: ***int c*** declares a regular integer variable, while **int *c** declares a pointer to an integer, and it holds address of another variable.

(8)- Asking chatbot regarding the concept of **Structures**.

Question: What is the difference between ***array*** and ***structure***?

Chatbot answer: Arrays store elements of the same data type while structures have variables of different data types.

Chatbot can also be used for editing documentation of a program or optimization of Code.

5-Statistic regarding student use of chatbot

Of 250 inquiries in an undergraduate course with 60 students, 200 were handled by chatbot, 50 handled by instructor.

Figure 1 displays student utilization of chatbot.

Canvas issue	1%
Homework	40%
Grade	10%
Announcement	4%
Deadline	15%
FAQ	15%
IT	15%

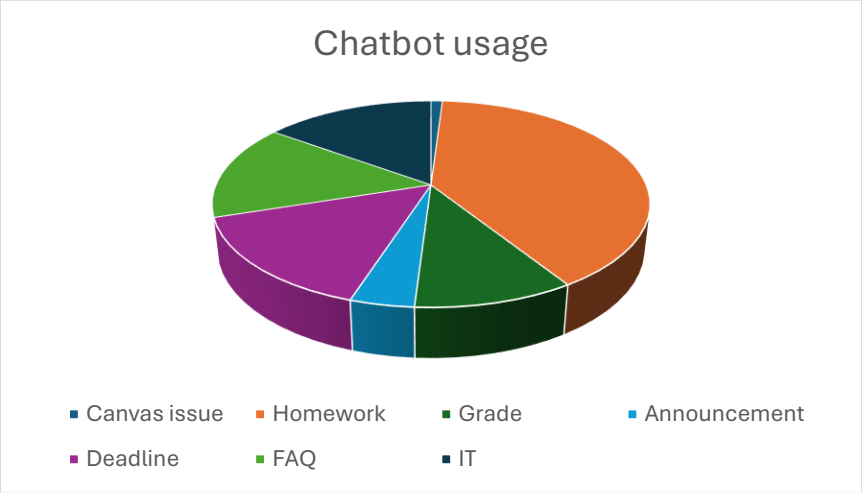


Figure 1 Student utilization of chatbot

Feedback from students is very positive. Following is their feedback.

(a)- With chatbot, searching through the course was easy compared to my other course without the use of chatbot.

(b)- Asking questions about homework or grades is very helpful.

(c)-Answers to my questions were accurate.

(d)- Chabot saves me a lot of time.

(e)- Asking questions for references/resources for the course was very fast compared to searching the course or asking from instructor.

6-Summary

Chatbots become an integral part of our daily life. Computers, smart phones, or home appliances use this software. Chatbot technology is not error free, however, it helps teachers and students in different capacities. Chatbot software facilitates interaction and is not to replace a teacher. It could be considered as one more educational tool. The same way we use PowerPoint slides to share lectures with the students. This tool helps instructors regarding office tasks by managing student data and facilitating scheduling for exams and quizzes.

Chatbot helps to solve the challenges facing students, instructors and universities. It serves as a reliable helper, they can provide 24-hour support to students by answering their questions, assisting them with non-academic queries, and advising them through their academic goals.

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