Dandelion for education

The right way to leverage ChatGPT in education sector

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Abstract

This white paper focuses on the challenge associated with the use of ChatGPT in the education section that students may become overly dependent on ChatGPT and suffer from a lack of positive thinking and superficial understanding[1]. One solution is to develop an online education platform, the platform combines the use of ChatGPT and involves the generation of customized quizzes and assignments based on students' learning activities, thereby it can guide students towards independent thinking and learning. This paper firstly defines the challenge that students may overly rely on ChatGPT and analyse the main stakeholders like students and teachers, then it gives the solution to develop a platform that combines the use of ChatGPT, and estimate the expected outcomes, which is students have a valuable educational tool to enhance their learning outcomes.

1 Problem statement

It is possible that students may become overly dependent on ChatGPT and suffer from a lack of promote active engagement, independent thinking, and deeper comprehension. When faced with the power that ChatGPT has available to them[2]. In the learning process, students may over-rely on ChatGPT to find answers and complete tasks without thinking about them. In this over-reliance, students may lose out on opportunities to develop creative and critical thinking[1], as they seek instant answers at the expense of their own independent thinking skills. As a result, students may simply rely on the responses generated by ChatGPT without really understanding and mastering the concepts and information[3]. If they do not think deeply about the context and rationale of the questions, they may simply memorise the answers provided by ChatGPT[4]. A superficial understanding may impair their ability to apply and synthesize their knowledge in the long run[5]. ChatGPT, however, has a wealth of knowledge and students may rely on it for information rather than actively seeking and sifting through it. As ChatGPT is not always completely accurate or authoritative, this can lead to

incomplete understanding of information. Students need to learn to independently assess and verify the reliability of information[6].

2 Background

A large-scale language model based on GPT-3.5 architecture, ChatGPT was launched by OpenAI in November 2022 by US technology company OpenAI[7]. ChatGPT has seen rapid growth and widespread adoption since its public launch in late 2022. With high accuracy and high-quality answers, ChatGPT is frequently used to answer questions, provide information, and support learning. As a powerful tool that performs well across a wide range of academic subjects and tasks, ChatGPT presents educators with a threat to their teaching practices[3]. When students can use ChatGPT to write assignments, answer questions and search for answers, they may become overly reliant on ChatGPT, which can negatively impact their learning and thinking abilities[8]. Some schools are banning the use of ChatGPT, however, it would be irresponsible to completely exclude ChatGPT from the curriculum. Students must be provided with appropriate guidance on the benefits and limitations of using ChatGPT. With ChatGPT, schools can unleash student creativity, provide personalised tutoring, and improve the way students interact with artificial intelligence[1].

3 Impact of ChatGPT on selected sectors and stakeholders

This part uses the interest-influence matrix to get all stakeholders[9], as shown in Figure 1.

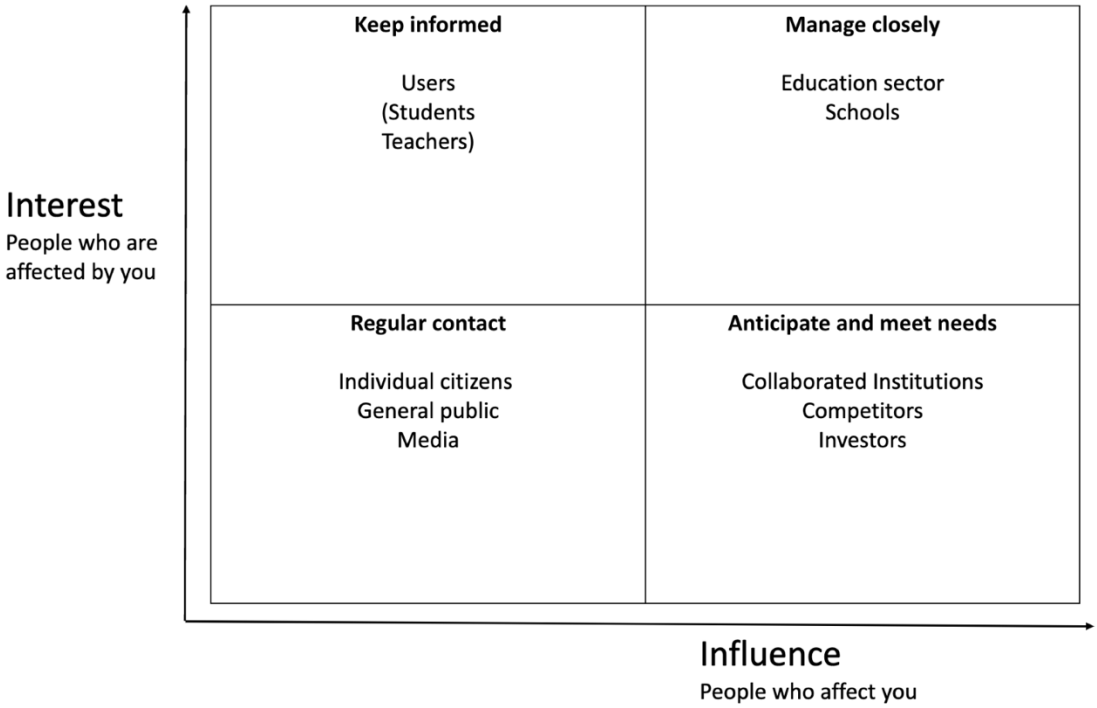


Figure 1 Interest-influence matrix

The target users are mainly teachers and students who use ChatGPT frequently to help them study[10]. They have great interest and are affected by the project. Teachers have a high interest in incorporating effective and innovative teaching tools to enhance student learning outcomes[11]. Although they may not have significant influence over the implementation of the platform at a systemic level, their input and feedback are crucial in shaping how the technology is used. Students are the primary beneficiaries of educational technologies. They have a high interest in using the platform combined with ChatGPT as a learning tool to access information, seek support, and receive personalized service. However, as users, their influence on the decision-making processes regarding the integration of ChatGPT may be limited.

There are also other stakeholders involved. The stakeholders that need to be managed closely are the education sector and schools. They play a crucial role in shaping educational

practices and policies, and they have a high level of influence and a strong interest in ensuring that the integration of ChatGPT in education aligns with the broader educational goals and standards. The public, including community members, individual citizens and media, have limited influence and interest in the specific integration of ChatGPT in education. While their opinion and comments may have a subtle impact, their direct involvement and influence in decision-making processes are minimal.

4 Solutions for responsible development and use of ChatGPT

4.1 Solution Overview

We have designed a learning platform called Dandelion. It has been integrated with chatGPT and can help us to solve the problem of over-dependence. As an online educational platform dedicated to providing a personalized learning experience for each student, Dandelion fully acknowledges that students are at different stages of learning, each with their unique challenges. A one-size-fits-all teaching method may not suffice, which is why we're consistently working on addressing the age-old conundrum of "teaching to the individual". Dandelion employs OpenAI's ChatGPT as its teaching engine, a sophisticated natural language processing model capable of understanding freely formed questions and prompts. The integration of ChatGPT not only enhances the interactivity of teaching but also makes it more personalized. It provides customized responses based on each student's questions and doubts, thereby fostering deeper learning[12].

4.2 Learning process

At Dandelion, we encourage students to take full advantage of the powerful features of ChatGPT by learning proactively through asking questions, rather than passively receiving information. Following Table 1 shows our different learning stages as well as a specific scenario.

Table 1 Dandelion Learning Process

To be specific, we have three stages for this learning process	Stage	To illustrate this solution, we consider a scenario in a programming class[13].
Learning Process This stage is much similar to our current learning procedure, i.e. students take regular lectures or tutorials in person or online to learn something new.	01	In the first stage, students learn how to program as usual.
After-school Thinking It happens after students finish their first stage and need some time for takeaway questions and review contents. In this stage, students can ask ChatGPT any questions they don't understand. Meanwhile, ChatGPT is trained not to provide the final answer directly but to provide a specific guideline to analyse the problems and help them to solve problems by themselves.	02	After getting into the second stage, students are confused about their quizzes and turn to ChatGPT for help. Instead of getting automated code for solutions, they might receive hints like "You can use inheritance" or "Why not try polymorphism?". Then they might be curious about "How can I implement inheritance in a Java program?" or "What are the benefits of using polymorphism in object-oriented programming?" These questions demonstrate their active engagement and curiosity. They will continue to get hints or work by themselves directly[14].
Customized practice ChatGPT will record frequently asked questions by a certain student and generate customized quizzes and assignments for them to practice according to different understanding for different students. However, if a student doesn't pose any questions, our platform provides a default set of assignments to ensure their learning progress and understanding stay on track. This allows a true reflection of the students' ability level. These genuine data points help our model establish subsequent learning plans to better propel each student's advancement.	03	Then these student-generated questions can be used to create customized assignments and tests. For example, if they asked too many questions on class hierarchy, ChatGPT will provide quizzes or assignments like asking students to define multiple classes with appropriate inheritance relationships for them to practice more. This would help them think independently and have a deeper understanding without the aid of ChatGPT. In this way, the use of customised tests and assignments based on their enquiries offers a practical solution for the problems caused by over- reliance on ChatGPT. This solution gives students the skills for success by encouraging independent thinking, active learning, and a deeper understanding.

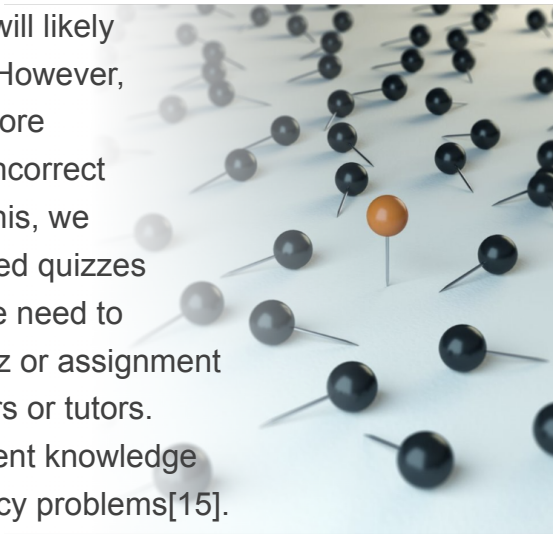
4.3 Responsibility

We also value responsibility. It is important to consider different kinds of potential problems after integrating a new technology.

- Privacy

It is a commonplace topic that ChatGPT would harm data privacy, and the issue of student privacy is the most important part in the education sector. In our Dandelion platform, we would cooperate with the universities, and use their database to guarantee that our students' personal information would be stored confidentially and safely.

- Reliability and accuracy.



When asked general knowledge questions, ChatGPT will likely respond with the correct information most of the time. However, when asked questions are framed weirdly or involve more specialised topics, ChatGPT is more likely to provide incorrect information or appear to be making it up. Because of this, we don't know whether ChatGPT will provide us with related quizzes or assignments or provide the accurate answer. So, we need to build a database for quizzes or assignments. Each quiz or assignment with corresponding answers is provided by our lecturers or tutors. Also, they have tags to help ChatGPT to choose different knowledge points. That would help solve the reliability and accuracy problems[15].

5 Expected outcomes and best practices

Positioning itself as an advocate for responsible AI, Dandelion incorporates AI learning tools such as ChatGPT into its system, not as a replacement for human tutors, but as an additional aid. This approach bolsters teaching effectiveness and allows educators to concentrate on cultivating essential skills in students, such as creativity and critical thinking. Dandelion maintains a balance by encouraging regular communication with educators, understanding their unique teaching goals, and accordingly offering personalized teaching modes to

students across different courses. Dande- lion's commitment to open dialogue with students ensures they fully comprehend and utilize the platform's resources, optimizing their learning outcomes. In transforming responsible AI guidelines into tangible practices, Dandelion prioritizes data security and ethical AI usage. It guarantees that AI acts as a complement to human teaching rather than a replacement. Further, Dandelion fosters responsible innovation by assisting educational organizations in integrating ChatGPT into their teaching tools. This allows organizations to effortlessly incorporate AI into their teaching processes while adhering to strict AI ethics. As a result, Dandelion contributes to a balanced and sustainable educational ecosystem that leverages the power of AI responsibly.

6 Conclusion

This white paper focuses on the problem that students may overly rely on ChatGPT and gives a solution that can ensure the responsible and effective integration of ChatGPT into the online education platform to solve the problem. The platform involves the generation of customized quizzes and assignments based on students' learning activities and guides students towards independent thinking and learning. By promoting integrity and responsible use of AI technology, students can be provided with a valuable educational tool that enhances their learning outcomes and prepares them for the future.

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