ChatGPT in Education: Angel or Evil?

-A Conceptual Model to Explore Educator's Attitude Change toward ChatGPT

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***Abstract*—ChatGPT as an innovative AI-based language generation chatbot has drawn a large amount of attention from educators and researchers in academia. Though ChatGPT possesses advanced technological functions, users from the educational field hold different opinions and attitudes toward ChatGPT. As using ChatGPT is becoming a non-stoppable trend, most educators and administrators changed their attitude from panic and prohibition to welcoming and embracing. This paper borrowed the concepts of attitude and attitude change from social psychology, and explained the attitude change toward ChatGPT among educators in higher education. Based on the ABC model of attitude and social judgment theory, we developed a conceptual model of attitude and attitude change from T1 to T2. We propose there will be a significant difference between attitude at T1 and that at T2 and explain such a change by using social judgement theory to highlight the significance of stimuli or persuasive messages from universities.**

Keywords—ChatGPT, attitude change, educator

I. INTRODUCTION

Since its official release in 2022, ChatGPT as a typical generative AI model has driven continuous and unexpected transformations in the fields of education, arts, medical science, and journalism with both exhilarating and unsettling implications. Generative AI is a framework to understand natural languages, and generate coherent and contextually appropriate answers through unsupervised or semi-supervised machine learning techniques [1]. Currently, the leading generative AI models include Generative Adversarial Network (GAN) and Generative Pre-trained Transformer (GPT) [2]. GAN is primarily used to generate speech, images, and videos [1]. ChatGPT, on the other hand, focuses more on text generation. It is a large language model trained by deep learning algorithms developed by OpenAI, and the model is based on publicly available resources. ChatGPT possesses the fundamental capability to process and generate human-like responses to textual inputs [3]. The original ChatGPT is based on language models such as GPT-3 or GPT-3.5, however, in March 2023, OpenAI further released GPT-4, which was embedded in the functions of ChatGPT plus, and greatly enhanced the model's overall performance. The new GPT-4 is said to be more advanced in three key areas: creativity, visual input, and longer context [4].

The interactivity and strong capacity for complex human task-solving imply its great potential in education. Though we are still at the beginning stage of ChatGPT usage, researchers in the educational field have studied both the positive side and negative side of using ChatGPT. Some researchers even question the exact nature of ChatGPT – will the next generation of chatbots be angel or evil for teachers and students in general? From the angel's perspective, firstly, ChatGPT can help students in searching for useful information and resources, improving language skills, facilitating collaboration, increasing efficiency and productivity, and providing support and motivation [5]. Moreover, ChatGPT can also help students or teachers construct new knowledge by providing an efficient source of new information and ideas [6]. For teachers, ChatGPT can be integrated into many educational processes, such as automating the teaching processes, creating teaching plans, assessing students' work, facilitating research [7], and even functioning as an intelligent tutoring system, simulating a human tutor to provide real-time assistance to students [8]. As to the evil perspective, pessimists treated ChatGPT as a threat, disruption, and the "end" of education [9]. The major concerns lie in high-tech plagiarism and writing skills. ChatGPT blurs the line between students' authentic, original work and AI-rendered text. Students may use the bot to write essays, finish assignments, find answers to challenging questions or calculate math problems [10].

Nowadays, generative tools like ChatGPT have inevitably wormed their way into the educational system, which caused panic among teachers and administrators at the beginning. Some schools have completely banned technology usage in the early stage, while others are gradually embracing it. At this moment, a study on educators' attitude change is timely and essential for

both researchers and practitioners. Prior studies have extensively discussed the pros and cons of the potential use of ChatGPT in education; however, few of them have explicitly studied educators' attitudes and attitude change over time via a longitudinal study. In this research, we propose a conceptual framework to better understand the evolving attitudes of educators toward ChatGPT. Our model draws from the Affective Behavioral Cognitive (ABC) model of attitude, and Social Judgment Theory, where the ABC model functions as the basis for understanding the components of attitude, and social judgment theory explains the possible changes in attitudes over time triggered by stimuli.

In the following, we will introduce the literature review on ChatGPT in higher education and attitude toward ChatGPT first. This is followed by the theoretical foundation and the development of a conceptual model. At last, research methods, expected results and conclusion will be delivered.

II. Literature Review

A. ChatGPT in Higher Education

Though ChatGPT was just introduced one year ago, previous research in pedagogy already discussed the duality of its impact. Some researchers argued for its angelic effects on education, while others expressed serious concerns about its huge and fast impact on education. There is also a certain amount of paper discussing both the positive and negative effects of ChatGPT. On the positive side, Baidoo-Anu and Owusu Ansah [7] suggested that ChatGPT has the potential to make breakthroughs in enhancing learning and teaching by providing personalized tutoring, language translation and automated essay scoring. Herft [11] also mentioned that ChatGPT can revolutionize education by bringing a lot of advantages for teachers in teaching and learning practices, such as preparing teaching materials, creating quizzes, etc. Last, after confirming ChatGPT's ability in many areas, Zhai [12] encouraged educators to create new teaching philosophies to embrace the new era of generative AI, e.g., designing AI-based learning tasks to boost students' creativity and critical thinking.

On the other hand, some scholars expressed constant worry about the implementation of ChatGPT in education, especially in the area of literary production and the issues related to plagiarized writing. Tlili et al. [13] found that the use of ChatGPT encouraged plagiarism and cheating, the tendency to breed laziness, and being prone to errors such as the provision of bias or fake information. The abuse of ChatGPT among students can also diminish their innovative capabilities and critical thinking. Last, lack of human interaction is one of the key concerns raised by educators. Ellis [14] indicated that teachers who actively build rapport with students and respond to their efforts influence students' self-perceptions and enhance learning outcomes. Generative AI like ChatGPT significantly limits its ability to replace this kind of tutoring work. In addition, the results from ChatGPT may contain stereotypes and bias, which leads to unreliable search results to mislead learners [15].

There are more papers discussing both the positive and negative sides of using ChatGPT. For example, Farrokhnia et al. [16] employed a SWOT analysis on ChatGPT to discuss its implications for educational practice and research. Similarly, AlAfnan et al. [17] also summarized the opportunities and challenges ChatGPT brings to education. Tlili et al. [13] also vividly summarize the dual effect of ChatGPT by "Teachers are talking about ChatGPT as either a dangerous medicine with amazing side effects or an amazing medicine with dangerous side effects".

B. Attitude toward ChatGPT

ChatGPT has both supporters and detractors in the educational field. A study focusing on the attitude toward ChatGPT is particularly necessary at the moment. There are general studies discussing the polarized attitude toward ChatGPT, but the study on attitude, especially attitude change over time are rare. Iqbal et al. [18] are among the few academic studies that explore specifically teachers' attitudes toward ChatGPT. They used Technology Acceptance Model (TAM) to understand the antecedents and consequences of attitude, conducted a qualitative interview with 20 faculty members, and concluded that university faculty need more information and education about ChatGPT in order to make informed decisions about its use. This result is consistent with Rudolph et al.[8] that innovations in technology have not revolutionized educational models due to a lack of consideration about how educators should implement it and how students would interact with the ChatGPT sources. It also supported McMurtrie's conclusion [19] that the teacher community has generally been resistant to adapting to changes in assessment methods and expressed concerns about students outsourcing written assignments to ChatGPT.

Overall, studies on ChatGPT in education, especially the attitude change among educators in higher education are rare in the literature. As ChatGPT is quickly spreading to almost all universities in the world, it is imperative for educators and university administrators to make appropriate and rapid decisions on the exact attitude toward ChatGPT. What is more, many institutions have changed their attitude from complete banning to curious and cautious acceptance. We therefore believe, like many other educational technologies (e.g., radio, film, Internet, etc.), ChatGPT will be an inevitable trend and euphoric revolution in education. Timing of attitude change is crucial. In this study, we would like to discuss the components of attitude by using the ABC model, and discuss the possible change of attitude due to certain stimuli or persuasion (by using social judgment theory) from university policy makers.

III. Theoretical Foundation

A. ABC Model

People's attitudes will influence social behavior. Attitude is a summary evaluation of an object or thought, and it is the affect for or against a psychological object [20]. The object can be anything a person likes or dislikes and may include people, products, and organizations [21]. Studying attitudes toward ChatGPT is essential, as based on Technology Acceptance Model (TAM) [22], it will directly influence the intention to use. To understand the components of attitude, we introduced the ABC model. ABC model [23] is one of the most cited models of studying attitude. ABC model suggests that attitude includes three basic elements - affect, behavior and cognition. Affect demonstrates the individual's feelings and emotions about an

attitude object, behavior denotes intention or action towards an object and cognition shows the beliefs and thoughts an individual has about an object. Though there are also other models/theories explaining the component of attitude, some even argue that the behavioral dimension should be separated from attitude; we still believe the ABC model is the most comprehensive theory to interpret many aspects of attitude. What is more, behavior or behavioral intention is not our target of study in the present research.

B. Social Judgement Theory

In terms of attitude change, there are many theories explaining how attitude can be altered over time. For instance, Retnowati [24] summarized seven major attitude change theories, which include behavioral, cognitive dissonance, affective-cognitive consistency, social judgement, social learning, functional and Krathwohl's taxonomy. Among them, behavioral theory and social learning theory explains people's attitude change when he/she gets reinforcement due to a certain behavior or learns by observing and imitating others. Cognitive dissonance and affective-cognitive consistency theories emphasize how to reduce inconsistency between one's behavior/affection and cognition. The functional theory focuses on how to realize a certain aim or desire (e.g., utilization, ego-defensive) by attitude change. Last, Krathwohl's taxonomy theory introduces the intensity of a given attitude built through successive stages. We borrowed social judgement theory in this research, and it is explained as follows.

Social judgement theory [25] suggests that people evaluate persuasive messages in light of their preexisting attitudes, which is called an anchor point. The anchor point depicts a person's viewpoint and perception of a specific issue. Based on this theory, people tend to compare new information they received to their anchor point, and it can lead to three results: (1) the individual perceives the information as consistent with their anchor point and accepts it; (2) the individual perceives the information as inconsistent with their anchor point and rejects it; (3) the individual perceives the information as falling within the latitude of acceptance and makes a modest change to their existing attitude. As the aim of the theory is to explain how attitude may change in the communication process, it is very suitable for our research design where persuasive messages are continuously delivered by universities, peers, and students. Educators' attitudes toward ChatGPT may change once persuasive messages fall within the latitude of acceptance. In other words, the gap between an educator's initial attitude toward ChatGPT and the attitude advised by the new messages is not significantly big. Some educational institutions may integrate ChatGPT as an auxiliary tool to enhance teaching and learning, which is consistent with educators' existing attitudes toward AI. After several rounds of successful promotions or persuasions, attitude change may occur. However, if the university policies promote ChatGPT as a replacement for human interaction or encourage laziness in learning, it may fall outside the latitude of acceptance and be rejected. Therefore, persuasive messages as appropriate stimuli for attitude change are very essential.

In sum, we employ both the ABC model of attitude and social judgement theory to explain the basic components of attitude, and how persuasive messages would influence university educators' attitude change toward ChatGPT.

The social psychology theory of ABC model has been widely used in the literature of information technology adoption. For example, Yang and Yoo [26] mentioned that affective and cognitive dimensions of attitude deserve more careful attention in information system adoption due to its potentially powerful influence on the implementation of technology and the diffusion of IT-enabled innovation in organizations. ChatGPT is one type of advanced AI-based language system, therefore, when studying attitude change toward ChatGPT, the ABC model from social psychology is very relevant.

Social judgment theory has been rarely used in attitude change of technology adoption. However, it has been utilized in changing resistant audiences [27], social persuasion [28], reactions to communication [29], and fake news correction [30]. We believe these applications of social judgement theory are highly relevant to our research context of ChatGPT adoption in higher education, especially the persuasive messages delivered by university policymakers.

Therefore, these two theories are suitable and applicable to the current research, and can provide a solid theoretical foundation for understanding how university educators' attitudes toward ChatGPT may evolve over time.

IV. Conceptual Model

Based on the above discussions in the literature review and theoretical foundation, we designed our conceptual model as shown in Figure 1.

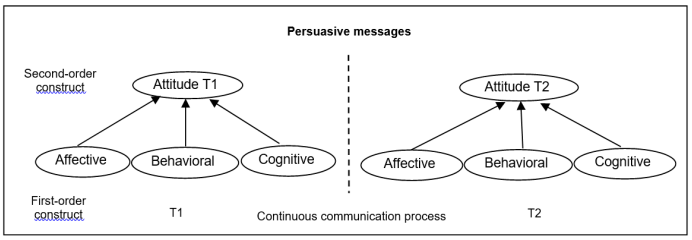

Fig 1.Conceptual Model of Attitude Change toward ChatGPT over Time

This is a longitudinal study that will be conducted in Time 1 (T1) and Time 2 (T2). The educator's attitude toward ChatGPT will be measured at T1 first. Attitude is treated as a formative higher-order construct consisting of three sub-constructs: affect, behavior and cognition [31]. Affect is the emotional component consisting of feelings and emotions toward ChatGPT. Typical measures include, e.g., "I feel confident about using ChatGPT in teaching and learning", and "I am optimistic in ChatGPT's function in facilitating students' learning". Behavior is the action component to act in a particular way towards ChatGPT, and it can be measured by "I will allow my students to use ChatGPT in an appropriate way", and "I will adopt ChatGPT myself when preparing teaching plans". Last, cognition is a mental component that consists of beliefs and perceptions people hold about ChatGPT. Typical measures could be "I believe using ChatGPT could enhance students' learning efficiency", and "I believe ChatGPT will

improve the teaching quality". In sum, based on the past literature, four to five items will be designed to measure the specific attitude components in the ABC model. This study aims to examine the change in university educators' attitudes toward ChatGPT over time. We propose the following hypotheses:

H1: Affect, behavior, and cognition are three important components of educators' attitudes toward ChatGPT.

H2: There is a significant difference between educators' attitudes toward ChatGPT at T1 and that at T2.

H3: Attitude at T2 is significantly higher than that at T1 due to the perception of the persuasive messages from the university via the continuous communication process.

V. Research Methods and Expected Results

This paper aims to use longitudinal research to investigate university educators' attitudes change. Our study is necessary in the present stage, as even though universities or policy makers have set up policies to embrace ChatCPT formally at school, it will still take some time for individual educators to accept or change their attitude toward AI-based language learning tools. Therefore, a longitudinal study is an ideal research method to collect data and reflect such a gradual change. Though varied across different geographical areas, generally the adoption of ChatGPT is still at the initial stage, we would like to collect data on ChatGPT now as T1 and collect data again by using the same sampling after one year as T2. The sample is university educators from all departments. For the data collection convenience, we would collect data from 8 universities in Hong Kong. We target the universities that originally prohibited ChatGPT or just began to welcome ChatGPT in university teaching and learning. An online questionnaire will be sent to the participants at the starting point. After one year, a follow-up survey will be conducted to collect data again on attitude at T2. In this way, we can track changes in participants' attitudes. The target sample size for the online survey is 500 university educators. After two rounds of data collection, a T-test will be conducted to test the significant difference between these two attitudes. We expected a significant difference between the attitudes at T1 and T2. And a much higher level of positive attitude should be observed at T2 compared with T1. We would be glad to see the affective, behavioral and cognitive changes reside in the educators' attitude over one year's time after long time's persuasive communication from the university.

VI. Practical Implications

From the social psychology perspective, we developed a conceptual model to understand the components of attitude and attitude change over time. The attitude refers to educators' attitudes toward a generative AI-based chatbot. We believe similar to all other technologies in education, ChatGPT is an inevitable and non-stoppable trend. As ChatGPT is quickly spreading to almost all universities in the world, it is imperative for educators and university administrators to make appropriate and rapid decisions on the exact attitude toward ChatGPT. This study provides a conceptual framework on the exact components of attitude toward ChatGPT. By doing this, university policymakers are able to know which dimension (e.g., cognitive) is more important in influencing decision-making, so they can emphasize this dimension in the persuading process. We also expect a significant change in attitude over time due to the continuous persuasive efforts from university policymakers. In this way, the policymakers can reasonably expect the amount of effort and effective persuasion results in the end. Hope this research can provide university policymakers and educators enough confidence in the transition period to adopt ChatGPT.

VII. Conclusion

The advent of ChatGPT, a large language model developed by OpenAI, has revolutionized the way students learn and teachers teach. There have been opposite opinions and attitudes toward ChatGPT in higher education. Some universities quickly and fearfully banned its usage, while others hold a positive and embracing attitude from the beginning. Employing the ABC model of attitude and social judgement theory, this paper developed a conceptual model to understand attitude components and attitude change toward ChatGPT. It is among the pioneer studies to explore such a change, especially from educators' perspective in pedagogy. One limitation would be that educators' attitude change may also be influenced by factors other than persuasive messages or stimuli from the university, e.g., the proliferation of similar tools, personal experience, etc. Further studies should pay attention to other influencing factors toward chatGPT attitude change. Through the longitudinal two-round survey, we expect a positive change of attitude from T1 to T2. At the moment, our study is at the beginning stage, hopefully, the proposed conceptual model is helpful and can provide timely and inspiring insights for university educators or administrators to rethink their attitude toward ChatGPT.

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