A Study of the Impact of Emotional Surrogates Provided by Companion AI on Real-Life Social Initiative of Active Users

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Abstract: With the rapid development of artificial intelligence technology, AI technology has gradually penetrated people's daily lives. Companion AI products, such as Replika and Character AI, offer users emotional support and companionship by mimicking natural language communication and establishing a simulated emotional connection with users through dialogues and other forms. User groups that frequently use the product and have a high level of interaction with it within a certain period usually reflect a higher demand for AI companion products and may become dependent on AI companion products in terms of emotion, social interaction, or entertainment, which in turn affects the willingness and behavioral ability of such users to initiate, participate in, or maintain interpersonal interactions in social interactions. This study uses questionnaires and data collection methods to analyze the impact of the emotional surrogate provided by companion AI on the real-world social initiative of active users. It is found that users' relationships with AI companion intelligent agents will impact their social initiative, and AI companion products will indirectly stimulate some users' social activity on social media platforms.

1 INTRODUCTION

Technological advances in Large Language Models (LLMs) have facilitated the rise of Role Playing Language Agents (RPLAs), which have vivid role-playing properties, thus catalyzing several AI applications, of which companionable AI products are one of them (Chen et al., 2024). This study looks at how the emotional surrogates provided by companion AI products (e.g., Replika, Character AI, etc.) affect the real-world social initiative of active users in the context of rapidly evolving technology in AI. This research is highly relevant in understanding the potential impact of AI products on social behaviors, especially at the intersection of psychology, sociology, and information science. It can provide a theoretical basis and practical guidance for the optimization and design of AI products (Strohmann et al., 2023). This study explores the role of companion AI on users' emotional compensation and how it affects users' social interactions in reality in two specific aspects, focusing on analyzing how companion AI products satisfy users' emotional needs and their impact on social initiative. Through the analysis of related literature, it is concluded that users turn to AI companion tools to seek emotional compensation due to the fear that sharing negative emotions in real life will affect others' moods, the inability to have 24/7 real-time interactions with real-life friends and relatives, the difficulty of being understood by others in real life, and the fear that sharing secrets with others in real life will be leaked.

In the existing research on human-robot emotional relationships, some scholars have constructed a theoretical framework that covers the types of relationships, formation mechanisms, and consequences, pointing out that intelligent social robots have important potential for emotional companionship and emotional comfort (Liu et al., 2024). Some scholars' findings indicate that individuals with higher loneliness are more likely to recommend AI partners with strong social presence, supporting the theoretical hypothesis of "emotional compensation" (Merrill et al., 2022). Some scholars have explored how virtual characters and intelligent assistants can help alleviate users' loneliness and anxiety and enhance their emotional satisfaction (Dang & Liu, 2023). However, there are relatively few studies on the impact of companion AI products on users' social initiative and their social interaction behaviors. Most of the existing literature on human-computer interaction in AI is limited to samples from specific groups, such as designing dialogue

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companions for the elderly to reduce their loneliness and social isolation (Alessa & Al-Khalifa, 2023). This study attempts to fill the research gap on the impact of human-computer emotional relationships on real-world social interaction by exploring the specific impact of emotional compensatory mechanisms on users' social initiative behavior.

The companion AI products referenced in this study are Replika, Character.AI, Talkie, Glow, Dream Island, after reviewing relevant information and literature on the functions and features of the above companion AI products to have a further understanding of the basis of the use of Python in the REDnote platform to carry out the keyword crawling, the keywords captured are AI companion, Replika, Character.AI, Talkie, Glow, Dream Island, for each keyword to select the top 50 hot posts to crawl, according to the results of the captured text to generate a word cloud map, trying to discover the user characteristics of these companion AI products. In addition, the questionnaire survey method is used and the sample data obtained is analyzed, and the advantage of this method is that it is highly flexible and operable, capable of designing structured questions for the research topic, and facilitating the systematic collection and analysis of a large amount of sample data. At the same time, the questionnaire can be filled out anonymously, reducing the social expectation effect, ensuring the objectivity and accuracy of the data, and providing a reliable basis for the subsequent statistical analysis. The object of the questionnaire survey is the active users of the companion AI, and to locate this target group, the questionnaire is selected to be distributed in the companion AI product-related topics and online communities on the REDnote platform; the ultimate research goal of this study is to explore the impact of the companion AI The ultimate goal of this study is to explore the impact of the emotional compensation provided by companion AI on the real social initiative of active users and to provide reference for theoretical research and practical application in related fields.

2 METHOD

2.1 Questionnaire

This study adopts the questionnaire survey method as the main research method, aiming to explore the impact of the emotional surrogate provided by companion AI on the real social initiative of active users. The questionnaire survey method can reflect users' behavioral patterns and psychological states through the collection and analysis of quantitative data, and it is especially suitable for the collection and analysis of large-scale samples, to improve the representativeness and universality of the results. In this study, the questionnaire can not only effectively assess the degree of satisfaction of AI companion products on users' emotional needs, but also explore in depth the specific impact of these products in terms of social behavior, emotional surrogacy, and real-life social initiative.

The research object of this study is users who actively use companion AI products, and the samples come from groups of different ages, genders, and regions to ensure the diversity and representativeness of the samples. The questionnaire design is based on the frequency and duration of users' use of AI companion products, the satisfaction of their emotional needs, and their impact on social behavior. The questions are set around the following aspects: the basic information of the users (gender, age, occupation, etc.); the frequency and duration of using AI companion products and the type of products most often used by the users; the changes in the social behavior of the users before and after the use of the AI companion products, especially the changes in the frequency of offline social interaction and online social interaction AI companion products 'support for the users' emotional needs and their impact on the real-life social initiative. The impact of AI companion products on users' emotional needs and real-life social initiatives.

In this study, data were collected through an online questionnaire, about 213 questionnaires were distributed, and 199 questionnaires were finally recovered, with a recovery rate of 93.4%. To ensure the validity of the questionnaire, a logical jump was set for the first question of the questionnaire, 'Have you ever used AI accompaniment products (e.g. Replika, Character.AI, etc.)'; so that only respondents who chose the 'Yes' option could continue with the questionnaire. Respondents who chose the 'Yes' option could only continue to answer the questionnaire. The valid questionnaires have been strictly screened to ensure data quality. The results of this survey will be used to analyze the impact of companion AI products on the real-world social initiatives of active users, especially the role of emotional compensation.

Among the valid samples, male participants accounted for 49.75 percent and female participants accounted for 50.25 percent, with a relatively balanced overall gender ratio. The 18-25 age group has the highest proportion, at 65.33 percent, and the proportion of respondents with bachelor's degrees or

above is higher, at 41.71 percent. This shows that the respondents are mainly young and have a higher overall education level. The proportion of interviewees who use AI companion products every day is 16.08%, and the proportion of those who use them more than three times a week is 29.65%. The proportion of users who use AI companion products for a single time is concentrated in the range of 10-90 minutes, and the proportion of those who use AI companion products for a single time for less than 10 minutes and more than 90 minutes is relatively low, which is 10.05% and 7.54% respectively. This indicates that respondents use AI companion products more frequently and for a longer single time, proving that the sample is consistent with the characteristics of active users of companion AI products.

The results of the questionnaire survey show that the emotional vicarious effects of the AI companion tool have different degrees of influence on users' social interactions, emotional regulation, and social initiative, and this study will further expand and deepen on this basis to explore the specific effects on real social behaviors.

2.2 Data Collection

Use Python to grab the data of the top 50 hot posts under the keywords AI companionship, Talkie, Dream Island, and Glow on the REDnote platform, and perform word frequency statistics on them respectively. After the word frequency statistics of 50 hot posts under the keyword AI companionship, the word cloud map in Figure 1 is generated, in which the words with higher frequency are companionship, emotion, chat, and so on.

Alt Text:A word cloud generated from the top 50 posts on REDnote platform related to the keyword "AI companionship." The cloud highlights the most frequent terms such as "accompany," "intelligent," and "chat," illustrating key topics in the discussions surrounding AI companionship and user experiences.

Figure. 1. Word cloud.

The same steps were used to continue the word frequency analysis of the hot posts under the keywords Talkie, Dream Island, and Glow. It is found that Talkie appears as a high-frequency word in the word clouds related to Glow and Dream Island. In addition, in the hot posts related to these four keywords, 'recommend cubs' appears as a high-frequency word, and after analyzing the details of the related posts, it is found that users of these four products call their original characters 'cubs', and some of the users choose to call their own original 'cubs; and some of them choose to call their own original 'cubs'. Some users will choose to make their original 'cubs' public on social media platforms, allowing 'cubs' to interpret the plot with other users, and this behavior is 'recommend cubs'.

3 RESULTS

In this study, data from 199 valid samples were analyzed through questionnaires using the statistical analysis software SPSS 12.0.

Result 1 The relationship between users and AI companion intelligent agents will impact users' social initiative.

The questionnaire data shows that 56.78% of the respondents are satisfied with the emotional support provided by the AI companion products, of which 69.85% choose to anthropomorphize the AI companion products, and 30.15% say they will not anthropomorphize the AI companion products. 56.28% of the users who anthropomorphized AI companion products said that they had developed a dependent emotion on AI companion products, and they tended to regard AI products as existences with personality traits, and preferred AI companion intelligent agents to accompany them as psychological consultants, virtual story characters, and game companions, and at the same time, they tended to learn and explore role-playing together with AI intelligent agents or to discuss daily life and emotional problems.

Table 1 was produced by importing the pertinent data into SPSS for correlation analysis to investigate the connection between the user's social initiative change and the relationship between the user and the AI companion intelligent agents.

From Table 1, it can be seen that there is a significant positive correlation between the relationship between the user and the AI companion intelligent agents and the change in the user's social initiative.

Table 1. Correlation analysis between user-AI companion relationship and changes in user social initiative.

		User-AI Companion Relationship	Changes in User Social Initiative
User-AI Companion Relationship	Pearson correlation coefficient	1	.792**
Changes in User Social Initiative	Pearson correlation coefficient	.792**	1

Note: ** indicates that the correlation is highly significant at the 0.01 level (two-tailed); * indicates that the correlation is significant at the 0.05 level (two-tailed), with positive values representing a positive correlation and negative values representing a negative correlation.

Result 2: AI companion products will indirectly stimulate some users' social activity on social media platforms.

In the process of using AI companion products, some users will generate online social behaviors such as exchanging and sharing experiences with other players on social media platforms, joining communities about AI companion products on social media platforms, and communicating with fellow players. To explore the connection between the degree of users' social activity involving AI companions in social media platforms and the change in users' social initiative, the relevant data were imported into SPSS for correlation analysis, and Table 2 was obtained.

Table 2. Correlation analysis between user's AI companionship activity on social media and changes in user social initiative.

		AI companionship activity on social media	Changes in User Social Initiative
AI companionship activity on social media	Pearson correlation coefficient	1	.759**
Changes in User Social Initiative	Pearson correlation coefficient	.759**	1

Note: ** indicates that the correlation is highly significant at the 0.01 level (two-tailed); * indicates that the correlation is significant at the 0.05 level (two-tailed), with positive values representing a positive correlation and negative values representing a negative correlation.

From Table 2, it can be seen that there is a significant positive correlation between the degree of users' social activeness involving AI companionship in social media platforms and the change in users' social initiative.

4 DISCUSSION

The relationship between users and AI companion intelligence will have an impact on users' social initiative, users who choose to anthropomorphize AI companion products want AI intelligence to accompany them in the form of existence with personality traits, for example, providing emotional companionship to users as a psychological counselor, virtual storytelling character, or game companion. Users of companion chatbots report that interactions with chatbots satisfy users' social needs and provide a safe and secure interaction experience, and that chatbots may undermine or replace human interactions (Guingrich & Graziano, 2023). In terms of psychotherapy, AI accompaniment is particularly suitable for individuals who are lonely or socially isolated, and AI products such as psychological counselors accompany with provide new digital tools

for mental health interventions (De Freitas et al., 2024). According to the data in Conclusion, 1, more than half of the users who anthropomorphized the AI companion intelligence became dependent on the AI companion intelligence, which is likely to lead to a compression of time and energy to cope with real-life social activities in the short term for these users, thus reducing their real-life social initiative.

Emotional surrogates provided by companion AI to promote real-life social initiatives of active users may be found in three AI companion products, namely Talkie, Glow, and Dream Island. In general video games, the character settings of the game characters are decided by the game development team, in which the users have less autonomous creativity (Pretty et al., 2024). However, in these three AI companion products users can freely create virtual characters according to their wishes. After the user inputs the character's personality characteristics, appearance features, growth background, and other key information, the AI companion tool based on the LLMs model can capture the character's personality to a certain extent and bring the character to life. One study compared the personality shown by the chatbot with the expected personality of the character by humans and calculated a consistency ratio of 82.8% (Wang et al., 2023). Such a high degree of reproduction stimulates users to some extent to create characters on their own and make these characters public on social media, allowing other users to interpret the plot with them, forming a co-creation mechanism. In addition, in-depth users will share tips for extending the plot on social media, and even join communities about AI companion products on social media platforms to communicate with fellow users, and these communication behaviors belong to the manifestation of the increase in users' online social initiative.

5 CONCLUSION

The findings of this study are that there is a significant positive correlation between both the users' relationship with the AI companion intelligence and the users' level of social activity involving AI companions in social media platforms and the changes in the users' social initiative. From this, two further research conclusions are drawn, most users who anthropomorphize AI companion intelligence become dependent on AI companion intelligent agents, which in the short term leads to the compression of these users' time and energy to cope with real social activities, thus reducing their real social initiative; the characteristic gameplay of the companion AI product stimulates the users to actively communicate with their peers in social media platforms, thus indirectly promoting the users' social initiative. This study has the limitation of insufficient sample diversity; the questionnaire respondents in this study mainly originated from the REDnote platform, which differs from the characteristics of user groups on other social media platforms. This may limit the applicability of the findings to a wider population. In addition, with a high proportion of young people in the sample, the findings may not adequately reflect the usage and impact of other age groups. In addition, it is not possible to provide insight into the long-term impact of companion AI on users' real-life social initiatives. Short-term dependence may transform into adaptive adjustment or further dependence in the long term, which requires a combination of longitudinal studies for more comprehensive conclusions.

This study expands the understanding of the social effects of AI companion products, provides a new perspective on the theoretical research and practical application of human-computer interaction, and points out the direction for future research in related fields. Future research should focus more on the following directions for in-depth investigation: through long-term tracking of user behaviors, revealing the dynamic changes and potential mechanisms of the impact of AI accompaniment products on users' social initiative. In-depth analysis of the possible negative impacts of AI accompaniment, such as the risk of social isolation caused by users' reliance on emotional surrogates, and how to design products to enhance users' social competence.

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