

## **Designing curiosity-driven AI chatbots for non-technical fields: A design science approach to supporting school counselors**

**Kalee Crandall**, *Utah Valley University, Kaleec@uvu.edu*

**Cherie Noteboom**, *Dakota State University, Cherie.noteboom@dsu.edu*

**Kevin Smith**, *Dakota State University, Kevin.smith@dsu.edu*

### **Abstract**

Artificially intelligent chatbots are becoming increasingly relevant in non-technical domains like school counseling, where professionals face growing demands and often hesitate to use data and available technology. This research employs a design science research methodology to create and evaluate an AI chatbot designed to support school counselors and explore the various design principles influencing satisfaction and continuance intention in a non-technical field. The artifact is grounded in principles of the Information Gap Theory and demonstrated through a single case study. The research contributes to the field of Information Systems by examining how AI chatbots can enhance decision-making and automate tasks in a non-technical field. The qualitative analysis results indicate that school counselors are likely to adopt an AI chatbot if it helps optimize their workload, establishes clear expectations, encourages ongoing interaction, and utilizes social comparison to foster support and engagement among users.

**Keywords:** AI chatbot, design science research, decision support, school counselors, information gap theory, curiosity

### **Introduction**

Artificial intelligence (AI) is driving transformative changes in nearly every industry with its ability to quickly process and analyze massive amounts of data and simplify decision-making. Chatbots, a form of AI, communicate with users by mimicking real-life conversations and can support individuals in non-technical fields such as school counseling through various tasks, including working with data. According to the American School Counselor Association (ASCA) National Model, school counselors are certified/licensed educators who spend their time directly supporting the academic, social/emotional, and career development of 100% of students (American School Counselor Association, 2019). Supporting these needs in all students is best accomplished by implementing a comprehensive school counseling program, which includes using data to both plan services and demonstrate the impact of school counseling services on student attendance, achievement, and discipline. Despite the recognized importance of using data in counseling programs, many counselors remain reluctant to use it in their program due to limited time (Crandall et al., 2020) or lack of education regarding how to use it to make decisions (Dimmitt & Zyromski, 2020).

AI chatbots, a technology requiring little training, can support school counselors in complex cognitive processes such as analyzing data, developing appropriate goals aligned with the needs of their students, and selecting effective interventions to assist them in accomplishing their goals. Although incorporating new

technology such as an AI chatbot can enhance efficiency, it may present challenges in school counseling where the hesitation to utilize available technologies persists (Mason et al., 2018). For technology to gain acceptance among school counselors, a traditionally non-technical audience, it must be thoughtfully developed to enhance the likelihood of satisfaction and continued use. This aligns with calls from Information Systems researchers, such as Lee (2023), who emphasize the need for expanding research on chatbots across various fields, as well as the various factors that influence acceptance of chatbots (p. 202).

This design science research aims to contribute to the expanding realm of chatbot research, support school counselors in working with data, and answer the research question, *“What are the design principles that influence satisfaction and continuance intention of an AI chatbot in a non-technical field?”* These objectives will be achieved through the creation and evaluation of an AI chatbot designed to incorporate elements of the Information Gap Theory (Loewenstein, 1994) to build the artifact, and Strauss and Corbin’s (1990) grounded theory analysis technique to reveal the various factors and design principles that influence the satisfaction and continuance intention of school counselors using the AI chatbot.

## Literature Review

Research on chatbots is increasing. Lee, Naan Ju, and Kyu-Hye Lee (2023) conducted a comprehensive examination of research trends and the intellectual structure of chatbots. Their systematic literature review, focusing on chatbot-related articles, revealed a noticeable increase in research activity within this domain over the last few years. Between 2004 and 2017, the number of publications focusing on chatbots was relatively small, with only a few articles published yearly. However, in 2018 the number of publications began to increase dramatically with 15 articles published, followed by 27 in 2019, 35 in 2020, and an impressive rise to 94 articles in 2021. The increase continued even more in 2022, with 136 articles published, indicating an expanding interest in the field.

The focus of current chatbot research is vast and diverse. Authors Ujwalakavya and Deepamala (2020) designed and developed an AI chatbot using the Botpress conversational AI Platform to support developers in a business environment who struggle to access business models and knowledge sources. Their research confirmed the chatbot's ability to deliver reliable responses and maintain high-performance levels, affirming that an AI chatbot is an ideal solution for individuals facing overwhelming work schedules. In their 2023 study, Ioana and Iancu explored the perceptions of middle-aged and aging adults regarding chatbots. The study revealed that perceived ease of use hinges on factors like effort, competence, and perceived external control in chatbot interactions. Moreover, perceived usefulness is reinforced by the ease of use and subjective norms. The research indicates that middle-aged and aging adults are more inclined to continue using chatbots (behavioral intention) when they find the interaction useful.

In a 2021 systematic literature review, researchers Okonkwo and Abe-Ibijola explored the different ways AI chatbots are currently used to support educators. The researchers revealed the most predominant use of AI chatbots was for teaching and learning, followed by administrative tasks such as offering automatic responses to student's questions. Very few articles focused on using an AI chatbot for assessment, or data analysis. The main focus of those articles that did focus on assessment centered around intelligent teaching systems that analyze and assess student's learning abilities (Okonkwo & Ade-Ibijola, 2021). The authors concluded by emphasizing the need for more research focusing on the technical advancements of AI chatbots.

Literature on chatbots that assist in data-driven decision-making (DDDM) is still emerging. In 2018, a researcher from India proposed a chatbot framework for processing big data. This framework integrates a

knowledge base and chat engine into the chatbot's design and connects it to a big data system to make the chatbot smarter and more effective at providing business insights (Sankar, 2018). Although the author suggests the potential of a chatbot to connect to a knowledge base and perform data processing, the authors provide little information regarding the actual testing and implementation of the system. More recent research reveals chatbots integrating AI capabilities, specifically ChatGPT-4 for data processing, are an effective data analysis solution for those with limited technical experience, and can provide new insights and improve decision-making processes by analyzing unstructured data, but are still not as proficient as data scientists (Patel & Shooshtarian, 2024).

Although research on chatbots is increasing and continues to evolve, there remains a need for more research to user's unique experiences with chatbots (Iancu & Iancu, 2023; Io & Lee, 2017), especially in nontraditional fields (Lee et al., 2023). The Information Gap Theory (Loewenstein, 1994), which posits that curiosity arises from perceived knowledge gaps, offers a compelling lens to explore how AI chatbots can motivate users in non-technical domains. Furthermore, there is a need to understand post-acceptance factors, as very few studies have examined factors related to the continued use of AI chatbots (Li et al., 2023). Gaining insights into user's experiences with AI chatbots in diverse, mainly non-technical, domains can offer valuable insights for advancing AI chatbot research and solving various challenges, including those faced by school counselors.

## **The Information Gap Theory**

Curiosity can be a powerful motivator for engaging and sustaining school counselors' interest in using a technology that assists them in the DDDM process. Curiosity has been shown to elevate intelligence, foster perseverance, amplify engagement, inspire superior performance, and propel individuals towards more profound and meaningful goals (Kashdan et al., 2018). Furthermore, foundational studies, such as Day's research in 1982, emphasizes curiosity is essential for motivation and learning.

Curiosity is the feeling of deprivation resulting from the awareness of an information gap or what one knows and wants to know (Loewenstein, 1994). It is the desire to understand a situation, or gain more understanding, to reduce tension that arises from high uncertainty or intrigue (Day, 1982). Research has shown curiosity can elevate intelligence, foster perseverance, amplify engagement, inspire superior performance, and propel individuals toward more profound and meaningful goals (Kashdan et al., 2018). Curiosity is therefore a motivating factor that can encourage users to learn things they may not be interested in otherwise. The kind of curiosity that drives individuals to solve problems can best be understood as a result of information deprivation (Loewenstein, 1994). The Information Gap Theory, introduced by George Loewenstein in 1994, explains "the situational determinants that influence the onset and magnitude of curiosity" and predicts curiosity will arise spontaneously when situational factors signal an individual to the existence of an information gap in a particular domain (p.93). According to the theory, curiosity is a motivating factor as awareness of specific missing information can trigger an unreasonably strong desire to fill an information gap (Loewenstein, 1994). Therefore, an information gap is a prerequisite for inducing curiosity.

Loewenstein (1994) suggests specific strategies for inducing curiosity. For example, asking curiosity-inducing questions can be one of the simplest ways to generate curiosity. Next, exposing individuals to a sequence of events can create curiosity about the outcome. Curiosity is also ignited when individuals seek to fill an information gap by learning how the events unfold and align with their mental script or narrative. According to Loewenstein, the pleasure associated with curiosity lies in discovering new information and satisfying curiosity. He states people will "expose themselves to curiosity-inducing stimuli if, by doing so, they enhance the pleasure subsequently derived from obtaining information" (Loewenstein, 1994, p. 90). Finally, motivation increases as individuals get closer to completing a goal or closing an information

gap. This proximity to the goal motivates individuals to continue their efforts toward reaching their desired outcome (Loewenstein, 1994). Using the strategies for evoking curiosity, as outlined in the Information Gap Theory, provided a guide for this study and the development of an artifact, specifically an AI chatbot, to assist school counselors in DDDM and motivate them to use and adopt a new technology.

## Methodology

This research follows Peffers et al.'s (2007) Design Science Research (DSR) Process Model and is guided by Hevner et al.'s (2004) DSR guidelines to build and evaluate an AI chatbot by exploring how to design AI chatbots for post-acceptance, as well as solve the challenges school counselors face in specific processes of DDDM. Using a DSR Methodology allows researchers to contribute to advancements and improvements in real-world applications and build and evaluate IT artifacts "intended to solve identified organizational problems" (Peffers et al., 2007, p. 77). The artifact for this research is an instantiation in the form of an AI chatbot. Using DSR can help explore AI chatbots' evolving capabilities and contribute to the theoretical knowledge base by creating the design principles needed for continued use. It can also offer a framework to answer the research question, "What are the design principles that influence satisfaction and continuance intention of an AI chatbot in a non-technical field?"

### Activity One: Problem Identification

There is a growing need for more research to understand user's unique experiences and post-acceptance factors of chatbots in nontraditional fields (Iancu & Iancu, 2023; Io & Lee, 2017). Next, because school counselors are still hesitant about using data as part of their practice (Hatch & Hartline, 2022; Young & Kaffenberger, 2015) additional tools and support are essential for supporting them in effectively using data. Recent research supports this, revealing school counselors are more inclined to adopt DDDM practices when they possess greater confidence, self-efficacy, and a strong belief in the value of the practices (Beasley, 2024).

Technological solutions such as an AI chatbot can help save school counselors time by emulating human decision-making and drawing its own conclusions through learning (Cheng-Tek Tai, 2020). It is the human-like characteristics in AI chatbots that have a positive impact on consumer trust, enhancing acceptance among users (Ding & Najaf, 2024). Despite these advancements, Griffith, Mason and Besler (2018) underscore the underutilization of technology in school counseling, reporting that school counselors often express discomfort learning and using technology, a challenge that may stem from inadequate training. Interestingly, AI has the potential to automate cognitive tasks, often requiring minimal training. Given these advancements, fostering motivation among school counselors may be the key to successful acceptance and intent to continue using technology within this traditionally non-technical field.

### Activity Two: Define Objectives for a Solution

Defining the objectives for a solution, including describing how the artifact will support solutions to identified problems, is the second activity in Peffers et al.'s (2007) DSR Process Model. Strategies for stimulating curiosity, as outlined in Information Gap Theory (Loewenstein, 1994), inform the design of the AI chatbot or "the artifact" and the creation of system requirements. The formulation of system requirements aligns with the second guideline of Peffers et al., (2007) emphasizing the need to define a solution's objectives clearly.

An AI chatbot can guide school counselors through the initial steps of the DDDM process, even without natural interest, by initiating curiosity. The following system requirements can stimulate curiosity, leading to satisfaction and continued use of the system.

- A. **Activate Preexisting Knowledge:** The AI chatbot should leverage users' existing knowledge and provide relevant information to "prime the pump" and initiate curiosity about a specific topic.
- B. **Information Gap Awareness:** The AI chatbot should be able to identify missing or unknown information (an information gap) and trigger a response to engage and address the user's curiosity within that domain.
- C. **Curiosity-Inducing Questions:** The AI chatbot should ask questions that stimulate curiosity and raise awareness of missing information.
- D. **Facilitate Social Comparison:** The AI chatbot should allow users to compare information output with others to activate curiosity.
- E. **Anticipated Outcomes:** The AI chatbot should create a script, or series of steps, that describe what will happen due to the interaction.
- F. **Pleasurable Process:** The AI chatbot should make satisfying curiosity pleasurable.
- G. **Continued Engagement:** The AI chatbot should provide information that continuously meets user's needs and provides value over time.

These system requirements, including posing thought-provoking questions, creating a script that stimulates a desire for information, and explaining the anticipated outcomes, can allow the AI chatbot to guide school counselors through the initial steps of the DDDM process. Additionally, the requirements can foster a sense of curiosity, leading to satisfaction and continued use of the system.

### Activity Three: Artifact Design and Development

Designing and developing the artifact, the third activity in Peffers et al.'s (2007) DSR Process Model, includes the actual design and creation of the artifact. The design of the AI chatbot is based on the system requirements, as well as the theories and research described in the literature review. To design the AI chatbot for this study, the online platform, Botpress was used. Botpress allows both beginner and expert developers to design and build custom AI chatbots. This platform was intentionally selected for this research as it allows easy duplication of chatbots and has functionality that enables the integration of custom knowledge bases into the chatbot design. This functionality is a prerequisite as each school has unique data that must be analyzed to determine its unique student needs. Knowledge bases collect and sort information from sources provided by developers in the form of specific websites, documents (PDF, HTML, .doc, .txt), tables, rich text, or the entire web. Another advantage of Botpress is its ability to allow developers to utilize AI through different features such as tasks, transitions, and generative AI. For example, tasks allow developers to provide examples of the output the chatbot should generate based on user input to improve the accuracy of output to users, transitions help developers classify user input into predefined categories using natural language processing to direct users to the appropriate conversational workflow, and generative AI creates a text response based on a user prompt and settings such as temperature and output length, using large language models such as GPT-3 and GPT-4.

The AI chatbot for this research incorporates the structure associated with task-oriented chatbots with the flexibility of non-task-oriented chatbots. Guiding school counselors through the DDDM process required the AI chatbot to be task-oriented, following the specific steps outlined in the ASCA Annual Student Outcome Goal Plan (American School Counseling Association, 2021) in the domain of school counseling. This plan guides school counselors through the sequential steps of DDDM, specifically identifying

achievement, attendance, or discipline data, creating a goal statement, and identifying strategies that could influence change related to the goal.

As the purpose of this research is to stimulate curiosity and explore its influence on continuance intention, principles of a non-task-oriented chatbot were also included in the design to allow flexibility in the flow of the conversation. This was accomplished using generative-based chatbot technology to produce responses. Generative chatbots use AI in natural language processing, natural language understanding, and machine learning to determine how to respond to users. As school counselors are guided through the DDDM process, the chatbot allows them to enter in text or ask unrelated questions outside the expected flow of conversation, and the chatbot then determines the intent behind their input and formulates a response. Machine learning techniques also allowed the chatbot to learn and improve its performance.

## **Activity Four: Demonstration**

The fourth activity of Peffers et al.'s (2007) DSR Model Process is demonstration, which refers to using the artifact to solve a problem. The artifact was demonstrated using a single case study approach. According to Yin (2018), single case studies are appropriate when focusing on a common case as they allow the research to capture circumstances related to everyday situations and provide information about processes related to theory. Data analysis in school counseling represents a common case as it is relevant to many school counseling programs. A single case study is also more realistic regarding the time and resources needed to complete a study. Finally, a case study approach allows researchers to examine the quality of the artifact in depth in an actual business, or in this case, school counseling environment (A. Hevner et al., 2004). Studying the artifact in a school counseling setting with actual school counselors is essential for understanding the artifact's ability to help them use data effectively.

## ***Participant Information***

K-12 school counselors in one of Utah's largest, most diverse districts were the selected audience. One hundred and twenty-nine school counselors received an email describing the purpose of the study and inviting them to participate. After completing the consent survey and agreeing to participate, school counselors received a follow-up email containing a link to their school's chatbot. They also received the anonymous evaluation survey link with instructions on completing it immediately after interacting with the chatbot. Although participation was voluntary, the researcher invited all school counselors at the 48 schools with a developed chatbot to join the research and use and evaluate the technology. This approach ensured a diverse sample, encouraging a wide range of age groups and different educational and technical backgrounds to participate and controlling self-selection bias. A diverse range of school counselors' ages and experiences also enhanced the study's external validity. Eighty-nine school counselors participated in the study and completed the survey between April 10, 2024, and April 18, 2024.

For a survey to be included in the analysis, school counselors had to interact with the chatbot and complete the evaluation survey during the data collection timeframe. According to Hair et al. (2017), surveys missing more than 15% of the responses are typically removed from the analysis. Using the 15% rule, surveys missing more than one response for any construct were not included in the analysis. Six survey responses were missing multiple responses and therefore removed, resulting in a total of 83 surveys for the analysis.

## ***Sample Population Demographics***

Table 1 describes the experience and age of the sample population. The average age of the school counselors who participated in the study was 43. The youngest participant was 26, and the oldest was 70. School counselors completing the survey had over 663 collective years of experience in the field, with an average of 8 years of experience. Their experience ranged from 1 year to 34 years.

**Table 1. Sample Population Experience & Age**

	Experience	Age
<b>Mean</b>	8.25	43.01
<b>Median</b>	6	42
<b>Standard Deviation</b>	7.05	11.33
<b>Skewness</b>	1.30	0.33
<b>Minimum</b>	1	26
<b>Maximum</b>	34	70
<b>Count</b>	83	83

Examining the descriptive statistics of age and experience reveals that while the distribution for age is normal, school counselors' number of years working is highly positively skewed. This distribution indicates that most of the study's participants were newer school counselors with less than five years of experience. The sample population of school counselors in this research accurately represents the population of all school counselors in the United States. Table 2 compares the gender and ages of those in the sample population to all school counselors verified against data from the Bureau of Labor Statistics, Census, and current job openings (Zippia, 2024). The average age of participants in the study is 43, which is only two years higher than the average age of all school counselors.

**Table 2. Comparison of Sample to Actual Population**

	Sample Population	Actual Population	P-Value
<b>Female</b>	80%	73%	0.938
<b>Male</b>	19%	26%	0.251
<b>Average Age</b>	43	41	0.123

The difference between the school counselors in the study and the overall population is not large enough to be considered statistically significant at a 95% confidence level (since the p-value for all three categories is greater than 0.05). This indicates that there is no statistically significant difference between the sample and the general population.

## Results

Evaluation is the fifth activity of Peffers et al.'s (2007) DSR Process Model. Evaluation measures how well an artifact supports a solution to a problem, and satisfaction surveys are commonly used to evaluate an artifact. After school counselors interacted with the AI chatbot, they completed an anonymous survey for the evaluation. Qualitative analysis was conducted on the open-ended survey questions to provide greater insight for exploring how to design an AI chatbot for continued use and answer the call from Lee et al. (2023) to use qualitative data to gain a deeper understanding of the various ways chatbots are used and the outcomes they produce.

Strauss and Corbin's (1990) grounded theory analysis technique was used for the qualitative analysis. The first step of this analysis is to identify codes using open coding in the responses. The open coding of raw responses resulted in 11 common codes with 64 total occurrences, as shown in Table 16. Next, axial coding was completed to explore relationships in the identified categories, which is essential for design science researchers to identify design principles. In fact, researchers suggest grouping design principles into broad categories provides a clearer understanding of thematically related design principles, making it easier for practitioners to implement them in practice (Khosrawi-Rad et al., 2024). Finally, selective coding was completed by examining the results of the axial codes. Selective coding

involves identifying a central theme based on the axial codes. The central theme in this research is design considerations for AI chatbots in school counseling. Table 3 shows the grounded theory analysis for the question, “*What would influence you to continue using this AI chatbot?*”

**Table 3: Qualitative Coding Results**

Selective Code	Axial Codes	Open Codes	Count of Occurrence
Design considerations for AI chatbots in school counseling	Chatbot Efficiency	User convenience	11
		Workload optimization	3
	Chatbot Information Quantity	Additional information and data sources	10
		More specific information	7
	Chatbot Improvements	Improvement to chatbot communication	5
		Evolution of the chatbot	4
		Improvements to functionality	4
	Organizational Influences	Improvement to accuracy of chatbot results	3
		Additional training	5
	Intrinsic Motivation	Organizational support	5
		Intend to use	7

A design principle is a fundamental proposition that can help designers ensure the needs of users are successfully incorporated into the design process and final artifact (Möller et al., 2020). The following findings from the qualitative analysis highlight key design principles for the AI chatbot:

1. The AI chatbot should highlight information gaps in knowledge for workload optimization.
2. The AI chatbot should use a well-defined script to establish clear expectations of the system's capabilities and purpose.
3. The AI chatbot should ask curiosity-inducing questions that encourage ongoing user interaction, allowing it to continuously learn and adapt to users' needs over time.
4. The AI chatbot should ask curiosity-inducing questions that encourage ongoing user interaction, allowing it to continuously learn and adapt to users' needs over time.
5. The AI chatbot should utilize social comparison to gain organizational and departmental support.
6. The AI chatbot should motivate users to continue using the system by meeting their needs and fostering continued engagement through open-ended closure.

## Discussion

For technology-based artifacts to be helpful, design principles should be presented in a way that is understandable and useful in real-world design (Gregor et al., 2020). The resulting design principles described below are grounded in principles of the Information Gap Theory (Loewenstein, 1994) and aim to bridge the gap between theory and practice, ensuring they are easy to understand and valuable for practitioners in the field.

### **The AI chatbot should highlight information gaps in knowledge for workload optimization.**

The AI chatbot should initiate curiosity by highlighting critical information gaps or directing users' attention to essential but potentially overlooked areas. One way the AI chatbot in this study highlighted school counselors' information gaps was by disaggregating their data and highlighting areas for improvement they may not have been aware of before using the system. Thus, the AI chatbot can reduce the time school counselors spend on lower-priority items by helping them focus on the significant gaps. This, in turn, can

increase their overall efficiency and the impact of their work. This concept aligns with the axial code, "Chatbot Efficiency," where users indicated a preference for tools that simplify access to data and save time. This theme had many occurrences in the open coding (14), suggesting that school counselors will continue using the system if it is free, easy to access, and improves their workload. This supports the findings of Ujwalakavya and Deepamala (2020), affirming that an AI chatbot is an excellent solution for those with demanding work schedules. Examples of the qualitative responses in this category include:

- *"info being easily accessible"*
- *"Having easy access to it. Ease of use."*
- *"If it saves me time analyzing data, I'll use it!"*
- *"Lighter workload. Improving interventions. Speed."*
- *"As long as it is easy and able to access the most current data available to me I will definitely use it!"*

**The AI chatbot should use a well-defined script to establish clear expectations of the system's capabilities and purpose.**

Once school counselors in this study initiated the conversation with the AI chatbot, they were provided a script outlining the steps of the interaction (e.g., "Throughout our conversation, we will use your school's data to identify student needs, create a SMART goal, and explore interventions specific to your student's needs.") Establishing clear expectations for what will happen during the interaction through the use of a script can increase a user's motivation to continue using a system and influence their overall satisfaction. This is consistent with the information gap theory, which states that exposing individuals to a sequence of events can create curiosity about the outcome, resulting in heightened motivation (Loewenstein, 1994). While the script used in the AI chatbot for this research helped establish clear expectations, it could have been more explicit about the AI chatbot's capabilities, particularly regarding the quality and quantity of the data it could provide. The second axial code, "Chatbot Information Quantity" suggests the need for sufficient information from the chatbot, which is a crucial design aspect for its acceptance and effective use.

The theme "Chatbot Information Quantity" had the second largest number of occurrences (17), as most school counselors in the study said they would continue using the chatbot if it incorporated data from other systems or provided more specific information. Examples of responses for this theme include:

- *"If it pulled more current data points I would likely use it more"*
- *"If it could read multiple forms of data at once and give our counseling department data points from multiple sources."*
- *"More in-depth strategies and recommendations for interventions."*
- *"If I could ask it about specific populations and have it give me more than the first snapshot."*
- *"If it gives more options for smart goals. Not just one."*
- *"If it comes up with solid interventions than I will continue to use it."*

**The AI chatbot should ask curiosity-inducing questions that encourage ongoing user interaction, allowing it to continuously learn and adapt to users' needs over time.**

The AI chatbot in this study was designed to ask curiosity-inducing questions such as, "Would you like to explore impactful interventions to help with your identified need?" Asking curiosity-driven questions such as this can encourage ongoing user interaction, and the more a user interacts with the system, the easier it will be for the system to learn the user's needs. Continual improvements to an AI chatbot's communication abilities, functionality, and accuracy of recommendations are essential for user satisfaction and continued use.

While some of the improvements were related to the functionality limitations of the platform used to develop the AI chatbots, others were related to the accuracy of the generative AI responses. One concern a few school counselors in this study reported related to the accuracy of the information provided by the AI chatbot. This aligns with recent literature, which reveals concerns remain about the accuracy of recommendations from AI chatbots (Khlaif et al., 2023; Patel & Shooshtarian, 2024). This also supports the theme, "Chatbot Improvements," which suggests the need for ongoing enhancement of the AI chatbot's communication abilities, functionality, and accuracy to ensure continued use in school counseling. Previous literature aligns with this finding, as both intelligence and anthropomorphism have been found to play a role in user adoption (Moussawi et al., 2021). There were 16 occurrences identified in the open-coding process related to chatbot improvements for continued use, including:

- *"Fix the problems: larger screen and text size; ability to save the chat (get it emailed, a summary, anything)"*
- *"If it matured."*
- *"new angles"*
- *"A full functioning chat."*
- *"If I could ask it more questions and it understood"*
- *"Overall, I had a good experience. From my experience, the chatbot had limited functionality. I asked it a specific question and it was unable to provide me with the answer I was looking for."*

## **The AI chatbot should utilize social comparison to gain organizational and departmental support.**

Allowing users to compare their results with others can activate curiosity (Loewenstein, 1994) and encourage system use. The AI chatbot in this research was developed to promote social comparisons, for example, by enabling school counselors to compare their suggested interventions with those implemented in similar schools. Using social comparisons to demonstrate how other schools have benefited from the information provided by the system can be an effective strategy for strengthening organizational and departmental support. This type of support is essential for the success of a system as it emphasizes the need for an organization to not only provide the system but also the education, training, support, and management needed to ensure the technology meets its intended goals. This aligns with the "Organizational Influences" theme, where counselors indicated the need for training, team, departmental, and district support for successful implementation. Ten identified occurrences related to this theme. Examples include:

- *"Department support"*
- *"If my whole team buys into using this, I feel it will be best."*
- *"More information sessions and education on using it"*
- *"district recommendation"*
- *"would need my district to pay for the chatbox."*

## **The AI chatbot should motivate users to continue using the system by meeting their needs and fostering continued engagement through open-ended closure.**

The AI chatbot in this study utilized open-ended closure as a strategy for continued engagement. At the end of each interaction, the chatbot would conclude with, *"Thank you for exploring your data with me today. Remember, I'm here to assist you whenever you have questions in the future. Before I go, is there anything else I can help you with?"* This approach fostered continued engagement while also offering support to meet the user's needs. This design principle aligns with the axial code "Intrinsic Motivation," where several school counselors expressed enthusiasm and a willingness to continue using the system based on personal interest, their needs being met, and their belief in the value of AI for future projects. Examples of codes in this category, derived from responses to the question, "What would influence school counselors to continue using the system?" include:

- *"I will use it regardless."*
- *"I'm already convinced."*

- *"I plan on using it. Continued success would be helpful"*
- *"I'm willing to keep working with it to see how it can help me, especially with data projects. I am excited to use AI more."*
- *"Nothing. Already motivated."*

The design principles identified through the qualitative analysis indicate what would influence school counselors to continue using the AI chatbot designed to assist them in DDDM. The findings indicate that for school counselors to be satisfied and want to continue using an AI chatbot, it must optimize their workload by highlighting information gaps, utilize a script to set clear expectations, encourage ongoing interaction by asking curiosity-inducing questions, use social comparison to gain support, and sustain user engagement by meeting user's needs and using open-ended closure.

## Limitations & Future Research

Although measures were taken to ensure valid and reliable results, this research is not without limitations. This study has several limitations that should be acknowledged. First, the use of a single case study limits the generalizability of findings beyond the specific school district context. While the sample was demographically representative, regional or cultural factors may influence chatbot acceptance in other settings. Second, reliance on self-reported data introduces the potential for response bias, and while qualitative responses offered rich insight, the generative nature of the AI chatbot introduced some variation in user experience, which may affect consistency in perceptions of satisfaction. Finally, although grounded theory coding was conducted systematically, further triangulation with focus groups or interviews could enhance the trustworthiness of the results.

The analysis was complicated due to the unpredictable nature of the AI chatbot's responses, as highlighted in the findings that some school counselors expressed positive experiences with the AI chatbot, and others did not. Because the responses varied based on AI, it was difficult to draw consistent conclusions regarding user confirmation and its influence on satisfaction. Additional research is needed to understand how incorporating AI changes a user's perceptions of a system to better understand the relationship between user perceptions and continuance intentions. Moreover, as AI chatbots are further developed, it is crucial to integrate ethical considerations, including data privacy and algorithmic bias, to ensure responsible use of this technology.

For school counselors, the study highlights how AI chatbots can be designed to ease the data-driven decision-making process by prompting curiosity and guiding goal setting—particularly for those who may feel overwhelmed by data or unfamiliar with data analysis tools. Counselors and administrators should consider implementing chatbot tools that offer simple interfaces, use school-specific data, and provide embedded professional development. For education technology designers, the study emphasizes the importance of embedding motivational strategies—such as curiosity-inducing prompts and clear task scripts—into system design to support engagement in low-tech environments. Future work should co-design with counselors to ensure alignment between AI system outputs and school counseling workflows.

Future research could also include additional data collection techniques, such as focus groups or interviews, to reduce the likelihood of bias and clarify any questions or issues that may arise from questionnaire responses. Finally, to improve the development and evaluation of AI chatbots, future research could also explore AI chatbots developed using alternative platforms with the ability to pull data effectively from multiple sources.

## Conclusion

Designing an AI chatbot to assist school counselors in the initial stages of DDDM is a complex, yet meaningful endeavor. Implementing the system requirements outlined in this paper for building a chatbot can help solve school counselors' problems and contribute to theory and Information Systems research. This study answers the calls of Iancu and Iancu (2023) for more research understanding users' unique experiences with chatbots and of Lee et al. (2023) to use qualitative data to gain a deeper understanding of the various uses of chatbots and the outcomes they produce in non-traditional fields.

The qualitative data in this study provides deeper insight into the users' unique experiences and the factors influencing satisfaction and intentions to continue using an AI chatbot. These factors include workload optimization, establishing clear expectations of the system, encouraging ongoing interaction, and utilizing social comparison to foster support and engagement among users.

The strategies for inducing curiosity were shown to effectively stimulate curiosity, supporting the propositions highlighted in the Information Gap Theory. Several qualitative responses indicate that the chatbot initiated curiosity by highlighting gaps in users' current knowledge of the technological capabilities and additional ways the system could be beneficial for assisting in DDDM and making the interaction pleasurable and exciting, all of which align with the system requirements and support the Information Gap Theory (Loewenstein, 1994). The research findings highlight the potential of AI to enhance decision-making and emphasize the value of using curiosity as a motivator to increase user satisfaction and encourage continued use of AI technology in non-technical fields, ultimately improving the services school counselors provide to their students.

## References

American School Counseling Association. (2021). *ASCA Annual Student Outcome Goal Plan*. <https://www.schoolcounselor.org/getmedia/deb52dcc-5c37-476f-b32b-c5520f2d91ec/annual-student-outcome-goal-plan.docx>

Beasley, J. J. (2024). Development of school counselors' evaluator identity: An investigation of the factors contributing to program evaluation engagement. *Professional School Counseling*, 28(1b), 2156759X241247161. <https://doi.org/10.1177/2156759X241247161>

Cheng-Tek Tai, M. (2020). The impact of artificial intelligence on human society and bioethics. *Tzu Chi Medicana Journal*, 34(4), 339–343.

Crandall, K. S., North, M., & Crandall, K. (2020). Digitally transforming the professional school counselor. *Issues in Information Systems*, 21(1), 1–11.

Day, H. L. (1982). Curiosity and the interested explorer. *Performance and Instruction*, 21, 19–22.

Dimmitt, C., & Zyromski, B. (2020). Evidence-based school counseling: Expanding the existing paradigm. *Professional School Counseling*, 23(1\_part\_3), 2156759X20904501. <https://doi.org/10.1177/2156759X20904501>

Ding, Y., & Najaf, M. (2024). Interactivity, humanness, and trust: A psychological approach to AI chatbot adoption in e-commerce. *BMC Psychology*, 12(1), 595. <https://doi.org/10.1186/s40359-024-02083-z>

Gregor, S., Chandra Kruse, L., & Seidel, S. (2020). The anatomy of a design principle. *Journal of the Association for Information Systems*, 21, 1622–1652. <https://doi.org/10.17705/1jais.00649>

Hair, J. F., Hult, G. T., Ringle, C., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (Second Edition). Los Angeles : Sage.

Hatch, T., & Hartline, J. (2022). *The Use of Data in School Counseling* (2nd ed.). Corwin.

Hevner, A., March, S., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS Quarterly*, 28(1), 75–105.

Iancu, I., & Iancu, B. (2023). Interacting with chatbots later in life: A technology acceptance perspective in COVID-19 pandemic situation. *Frontiers in Psychology*, 13. <https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1111003>

Io, H. N., & Lee, C. B. (2017). Chatbots and conversational agents: A bibliometric analysis. *2017 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)*, 215–219. <https://doi.org/10.1109/IEEM.2017.8289883>

Kashdan, T. B., Disabato, D. J., Goodman, F. R., & Naughton, C. (2018, September 1). The Five Dimensions of Curiosity. *Harvard Business Review*. <https://hbr.org/2018/09/the-five-dimensions-of-curiosity>

Lee, S. E., Ju, N., & Lee, K.-H. (2023). Service chatbot: Co-citation and big data analysis toward a review and research agenda. *Technological Forecasting and Social Change*, 194, 122722. <https://doi.org/10.1016/j.techfore.2023.122722>

Li, L., Peng, W., & Rheu, M. (2023). Factors predicting intentions of adoption and continued use of artificial intelligence chatbots for mental health: Examining the role of UTAUT model, stigma, privacy concerns, and artificial intelligence hesitancy. *Telemedicine and E-Health*, 30. <https://doi.org/10.1089/tmj.2023.0313>

Loewenstein, G. (1994). The psychology of curiosity: A review and reinterpretation. *Psychology Bulletin*, 116(1), 75–98.

Mason, E., Griffith, C., & Belser, C. (2018). School Counselors' Use of Technology for Program Management. *Professional School Counseling*, 22(1). <https://doi.org/10.1177/2156759X19870794>

Möller, F., Guggenberger, T. M., & Otto, B. (2020). Towards a method for design principle development in information systems. In S. Hofmann, O. Müller, & M. Rossi (Eds.), *Designing for Digital Transformation. Co-Creating Services with Citizens and Industry* (pp. 208–220). Springer International Publishing.

Okonkwo, C. W., & Ade-Ibijola, A. (2021). Chatbots applications in education: A systematic review. *Computers and Education: Artificial Intelligence*, 2, 100033. <https://doi.org/10.1016/j.caeari.2021.100033>

Patel, P., & Shooshtarian, S. (2024, June). *The role of chatbots in data analytics: An evaluation of functional abilities*. [https://doi.org/10.1007/978-3-031-62277-9\\_10](https://doi.org/10.1007/978-3-031-62277-9_10)

Peffers, K., Tuunanen, T., Rothenberger, M., & Chatterjee, S. (2007). A design science research methodology for information systems research. *Journal of Management Information Systems*, 24(3), 45–77.

Sankar, R. (2018). EMPOWERING CHATBOTS WITH BUSINESS INTELLIGENCE BY BIG DATA INTEGRATION. *International Journal of Advanced Research in Computer Science*, 9, 627–631. <https://doi.org/10.26483/ijarcse.v9i1.5398>

Strauss, A., & Corbin, J. M. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. US: Sage Publications, Inc.

Ujwalakavya, J., & Deepamala, N. (2020). Chatbot for business environment using botpress conversational AI platform. *International Research Journal of Engineering and Technology (IRJET)*, 7(4), 6503–6507.

Yin, R. (2018). *Case Study Research and Applications: Design and Methods* (6th ed.). Sage.

Young, A., & Kaffenberger, C. (2015). School counseling professional development: Assessing the use of data to inform school counseling services. *Professional School Counseling*, 19(1), 46–56.

Zippia. (2024, April 5). *School Counselor Demographics and Statistics In The US*. School Counselor Demographics and Statistics in the US. <https://www.zippia.com/school-counselor-jobs/demographics/>