

**Ready, Set, GOAL! Using Chatbots to Increase 8th Grade Girls' Confidence  
in SMART Goal Setting**

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**Abstract**

This action research project examined the effectiveness of a customized artificial intelligence (AI) chatbot in increasing 8th Grade girls' confidence in setting SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goals for computer science projects. Students often struggle with planning and organizing long-term projects. The SMART goal process is one method in which students can break down larger projects into more manageable parts. Twenty-one students participated in this 15-week study, utilizing the Flint educational AI platform to guide them through multiple iterations of the goal setting process. A mixed-methods approach was used for data collection, incorporating pre- and post-action questionnaires, exit tickets, chatbot transcripts, student interviews, video reflections, classroom observations, and class discussions to determine changes in student confidence and agency. Four key themes were identified from the data analysis: the tone and language of the chatbot had a significant influence on student engagement and SMART goal development; guidance from the chatbot increased student agency in creating SMART goals; students used the AI chatbot as a tool, but not a replacement for the teacher; and multiple iterations of the SMART goal setting process improved students' levels of confidence and independence. The findings highlight the importance of balancing the use of AI tools in the classroom with teacher instruction. The use of AI technology in education has potential benefits and risks. The results of this study suggest that the relationship between teachers and students is an important factor in determining academic success. The importance of human interaction should not be underestimated by increased integration of technology tools.

As future technology tools are introduced, teachers should continue to be the instructional leaders of the classroom. Technology should remain in its role as a supporting actor.

## **Ready, Set, GOAL! Using Chatbots to Increase 8th Grade Girls' Confidence in SMART Goal Setting**

The action research topic of “Navigating the AI Frontier” in girls’ schools arrived at the perfect time. Artificial intelligence has been integrated into many facets of our everyday lives, including the lives of students. The Bryn Mawr School has been exploring the relationship between AI and education, and I saw the 2026 Global Action Research Collaborative (GARC) as an important opportunity to contribute to my school community.

Students at my school explore a variety of topics and work on several large projects throughout the semester in 8th Grade Computer Science. These projects are mainly independent, and students are expected to create and execute a plan for their work. For my research study, I introduced SMART goal setting as a way to incorporate AI into my lessons and for students to organize their project tasks. My research question was: *How does the use of a customized AI chatbot build confidence in SMART goal setting in Computer Science for 8th Grade girls?*

I conducted my action research to better understand how my students interacted with an AI chatbot and how this shaped their learning experiences, particularly regarding their level of agency and confidence in the classroom. Agency can be defined as the capacity to make independent decisions, based on personal values and goals, that influence an individual’s actions and outcomes. Student confidence is trust in one’s abilities and the belief that one can face challenges and succeed. Both agency and confidence play a vital role in a student’s classroom experience.

Because action research is teacher-led, I was able to make adjustments to my methods during the project, based on student feedback. Data gathered from this research were used to determine student attitudes toward AI and helped determine how our school will incorporate AI tools into our middle school curriculum in the future.

## Literature Review

Goal setting is a crucial skill for learning. Conley (2016) notes that for students to learn effectively, they “want to be involved in the instructional process and they want to be champions of their own learning” (113). Goal setting assists students in creating intention for their work, which helps to focus their attention on the specific academic tasks needed to achieve their goals (Williams, 2019). Students who are engaged in the goal-setting process increase their “original thinking, personal independence, and responsibility” (Conley, 2016, p. 17). Conley’s study, which examined goal setting’s effect on middle school students’ academic achievement, concluded that putting more ownership on the students through the learning process helped them identify their goals. Student-informed goals focus on the specific needs of a student, helping them identify how they learn and what motivates them. Spencer and Juliani (2017) explain that setting goals helps students improve their self-management and leads to student empowerment, allowing them to “monitor their progress and reflect often on how they are doing and what they need to do next in order to progress” (p. 83).

Proper guidance and instruction are vital for goal setting to foster student empowerment and be effective. Williams’ (2019) focused on the importance of the educator’s role in goal setting and notes that educators must have a thorough understanding of the goal setting process and be responsible for setting up this process for their students. By creating short-term goals, students are more likely to succeed in achieving their objectives, which boosts their self-confidence and trust in the goal-setting process. This, in turn, strengthens their learning agency.

Learning agency is closely tied to students’ self-confidence and motivation. A Finnish study assessed the perceived learning agency of both primary and lower secondary students (Soini et al., 2023). In this study, the term “learning agency” included “motivation, efficacy beliefs, and strategies to make sense of one’s own learning intentionally” (Soini et al., p. 64). Soini et al.’s results from a survey that assessed school-related social support highlighted the

differences in the factors that contribute to a stronger sense of learning agency for girls versus boys. Girls' learning indicated a stronger focus on interaction with both teachers and peers when compared to boys. Girls also exhibited a higher correlation to peer support increasing learning agency compared to teacher support. For girls to enhance their learning through goal setting, therefore, peer support, and effective teacher instructions must be integrated to ensure learning agency and motivation.

SMART goal setting is a process to create a goal that is specific, measurable, achievable, relevant, and time-bound (Patterson, 2026). Research shows that "setting clear and challenging goals leads students to achieve more academically" (Aponte Bojorquez, 2024, p. 5). Aponte Bojorquez (2024) determined that 2nd Grade students using the SMART goal setting process experienced a positive effect in their academic work, felt more empowered in their learning, and showed more motivation in working hard to achieve their goals.

Several studies show a strong positive relationship between SMART goal setting and student self-confidence. For example, Muñoz and Tutistar Jojoa's (2014) research, which focused on a group of 7th and 9th Grade students in Colombia who were learning English, showed a positive correlation between students' ability to set SMART goals and their confidence levels on listening tasks. They found that "this study also contributed to increases in self-directed learning, making students more responsible and autonomous of their own learning process" (p. 49). This knowledge enables students to apply goal-setting strategies to other areas of their lives.

SMART goal setting can be introduced to students of various ages and in different fields. Poe et al. (2021) conducted a study with undergraduate and graduate students who were engaged in reflection and planning activities designed to promote a growth mindset and encourage setting SMART goals. Student responses indicated a positive attitude toward

reflection and planning activities. Overall, students in the study indicated that these activities aided in their ability to succeed in their courses.

One method to implement reflection and planning into the SMART goal setting tasks is by using chatbots. Generative AI chatbots are an artificial intelligence computer program designed to generate conversation with a human user. These chatbots are tools that have the ability to perform a wide variety of tasks, depending on how they are programmed.

Chatbots have the potential to assist with gaps in both traditional and online educational systems, particularly in the areas of student engagement, instructor workload, and personalized learning, as they provide timely feedback and create an interactive and dynamic learning experience for students (Davar et al., 2025).

To assist in the setting of SMART goals, chatbots can engage students in conversations that lead to goal creation. Chatbots offer a method to conduct conversational surveys, which research has shown leads to higher quality responses and increased engagement from participants (Xiao et al., 2020). Results from a study conducted with an AI-powered chatbot indicated “that conversational surveys draw out more relevant and richer user responses as well as foster better engagement” (Xiao et al., 2020, p. 25). A well-designed chatbot can help keep students engaged in working through the SMART goal setting process.

Repeated use of chatbots can be a valuable resource in assisting students with setting their own SMART goals. Wen’s (2024) research explored how university students in an engineering course used an AI chatbot to learn how to set SMART goals and create study plans. Once students became familiar with the chatbot, students were expected to utilize the chatbot to set study goals every three weeks throughout the course. Results of the study suggested that the AI chatbot was successful in improving students’ ability to create effective SMART goals. For my research, I used a chatbot to guide students through the process of setting SMART goals for their computer science projects. They utilized the chatbot to help them

break down a large, multi-day project into smaller, specific tasks. Data were collected to determine the effectiveness of the chatbot in helping students increase their confidence in setting SMART goals.

### **Research Context**

The participants in the study were 21 8th Grade computer science students at a private girls' school in Baltimore, MD. This course met for three 45-minute periods per ten-day cycle. The action and data collection occurred during the 15 weeks of our first semester. I selected two of the four 8th Grade sections to be the research participants because I felt that they would benefit from some experience in using AI in the classroom before moving on to Upper School. All students participated in the lessons. Participation in the research was voluntary, and parents were emailed an opt-out letter at the beginning of the school year. Students were assigned a letter name to maintain anonymity in the data collection, analysis, and reporting. I obtained specific permission for use of student video recordings that would be included in my presentation.

### **Research Action**

The intervention in this action research project involved the use of a customized chatbot, SMARTie, in my 8th Grade computer science class. SMARTie was developed using Flint (2026), an educational AI platform that provides various features to help personalize learning in schools. The purpose of the chatbot was to provide students with assistance in setting SMART goals for their class projects.

Eighth Grade students received an introductory lesson on the SMART goal setting process in our advisory program. Students did not use the chatbot for our first goal-setting session. Instead, I assisted students with setting a SMART goal focused on improving their technology use. For the following iterations of SMART goal setting, students utilized the Flint chatbot, SMARTie.

Students were able to access Flint by using a direct link posted on Canvas, our learning management system. The chatbot was designed to guide students through creating SMART goals for a multiple day project. The chatbot was instructed to ask questions about the project without generating answers for the students. For each chatbot session, the project rubric was uploaded for the chatbot to reference. The chatbot was instructed to use this rubric as a guideline to ensure students' goals included all required elements of the project. If a student forgot to include an element of the rubric, the chatbot alerted them to what was missing, and prompted them to revise their goal accordingly.

The chatbot settings were updated for each project. The initial settings caused the chatbot to ask wordy questions, and it often prompted students to repeat themselves throughout the conversation. As SMARTie guided students through setting a SMART goal for their app project, it would often give examples of answers to the questions it asked. After this first session, multiple revisions were made to the chatbot before using it for the second session with students. Updates included instructing SMARTie to be less repetitive, more direct, and only asking one question at a time. Students were able to interact with the chatbot for a second iteration of goal setting related to their Python final project. In this session, students focused on creating specific goals for the required coding elements for their project. They were instructed to create a separate SMART goal for each of the three classes dedicated to this project. The intervention was designed to offer students guidance with setting SMART goals, with the expectation that multiple sessions would increase their confidence in setting goals on their own.

### **Data Collection**

During my action research study, I used a mixed-methods approach to data collection. I put a greater focus on qualitative data collection to ensure that student voice was prevalent in my research findings. Quantitative data collection was used to determine and highlight patterns. Mertler (2025) emphasizes that polyangulation is crucial for attaining valid and authentic data,

so I incorporated a variety of data collection methods into my study. These methods included student questionnaires, exit tickets, student work samples, classroom observations, student chatbot transcripts, and student interviews.

After some initial exposure to SMART goal setting, I conducted a pre-action questionnaire to offer a comparison of students' thoughts and understanding of SMART goals from the beginning to the end of the research study. Within the questionnaire, students replied to open-ended questions regarding experience with goal setting, ranked their confidence levels in goal setting, and commented on their thoughts about the usefulness of goals. These answers provided a baseline of students' understanding of SMART goals prior to the implementation of the action. I used the same questions in a post-action questionnaire at the end of the study to determine changes in students' confidence about SMART goal setting using the AI chatbot.

Throughout my study, students participated in multiple activities focused on the SMART goal setting process. One of the key activities was their interaction with a customized AI chatbot, SMARTie. SMARTie guided students through the SMART goal setting process for two of our class projects. I collected chatbot transcripts to analyze the individual conversations students conducted with SMARTie. Classroom observations were made to distinguish student habits when setting goals both with, and without, the assistance of SMARTie. Student interviews were conducted to gather student feedback on the process of using SMART goals in the computer science classroom. A final written reflection provided students' views on the effectiveness of the chatbot, in addition to the SMART goal setting process.

### **Data Analysis**

I analyzed the research data using the process of organization, description, and interpretation (Mertler, 2025). I reviewed qualitative data to determine patterns in responses that would assist in answering my research question. Classroom observations helped inform my understanding of student behavior in reference to their responses in reflections and exit tickets.

The triangulation of data assisted me to identify key themes focused on the student experience. The themes described changes and trends related to students' confidence with SMART goal setting.

### **Discussion of Findings**

Upon completion of my data analysis, four central themes were identified and developed into thematic statements. Each theme explores an important aspect of the relationship between the students and the chatbot, and how that contributed to students' confidence with setting SMART goals.

#### **Language and Tone of an AI Chatbot Influences Girls' Engagement and Development of SMART Goals**

The tone and language of the chatbot had a noticeable effect on the students' interactions and how they felt about the chatbot experience. After the first session, many students shared that SMARTie was annoying, repetitive, and did not understand what they were trying to say. As SMARTie asked students to repeat themselves multiple times, some students became frustrated with the conversation. One student responded, "I already answered that question. I think we're done here." Another response was, "I think my goal is fine the way it is." Many students felt the chatbot talked down to them and doubted their ability to complete the project in the given timeframe. One student shared that SMARTie "was very, um, skeptical about our, like, capability to complete the goal."

The chatbot's tone of skepticism was discouraging to students and created some adversarial feelings. For example, during a student session, SMARTie asked a student if her goal was realistic, or "if she was setting [herself] up to feel stressed and disappointed?" The chatbot used this phrasing twice during the same student session. SMARTie asked another student "does that feel realistic to finish in the 3 work days, or is that maybe a bit too much?" A

few students also shared that they felt the chatbot was “rage baiting,” while another student commented, “I really felt like it was not trying to help me, and it was trying to confuse me.”

Settings were adjusted before students conducted their second goal setting session with the chatbot. After these adjustments were made, students seemed to have a more positive experience during their second session. Many students noticed a change in the tone of the chatbot and felt that SMARTie’s questions and responses were more concise. Student Q shared that she “felt like SMARTie was listening to what I was saying and trying to help me build off of my ideas, rather than trying to guide me through it and giving me its ideas. And I felt that kind of changed the amount of confidence I had in my SMART goal.”

In our class discussion, Student O stated “the first time it felt like SMARTie was working against you, the second time, it felt like SMARTie was working for you.” Other students shared that when the chatbot was “extremely straightforward” and “more cooperative,” it altered the tone of the conversation, and they were more open to working with SMARTie. When students interacted with a conversation partner they viewed as an ally, both their receptiveness and engagement improved. The increase in engagement led to greater development of their SMART goals.

### **AI Chatbot Guidance Increases Student Agency in Creating SMART Goals**

Student agency involves taking ownership of one’s learning by setting goals, taking action toward goal achievement, and reflecting and redirecting progress toward goals (Poon, 2018). Self-efficacy is also tied to student agency. Research shows that students with high self-efficacy tend to have higher academic achievement (Lopez-Garrido, 2025). The SMART goal setting process is one method to assist students with goal creation. By using SMARTie, students were able to increase their belief in themselves and develop the ability to create achievable goals. This improved student agency and allowed students to take ownership of the goal setting process.

According to pre-intervention questionnaire responses, 14 students agreed that goal setting was helpful. Almost all students responded that they had set goals in the past and understood that this process could be beneficial to them. When asked about their experience with the goal setting process, one student commented, "I don't like going through the process, but it's worth it for the end result." However, multiple students shared that they struggled to follow through and achieve their goals.

After each goal setting session, students completed a brief exit ticket about their experience. Seven students found setting a SMART goal to be "somewhat easy" or "easy" after a teacher-led lesson. After the first SMARTie session, six students responded that setting their SMART goal was "somewhat easy," "easy," or "very easy." After the second SMARTie session, 15 students responded that they found setting their goal to be in the easy category, suggesting that SMARTie had a positive effect on student confidence. In our class discussion, many students shared their appreciation for how SMARTie explained each step to guide them through the process. Student P felt that the goal setting process was "even more fun and more engaging doing it with SMARTie."

Students shared that having the chatbot serve as a goal setting assistant made the process feel more manageable, which increased their agency. One student reflected, "I really liked how SMARTie would repeat the things you said and like, help you add on to your SMART goal, because it kind of made me feel like there was less pressure on me." Another student stated that "setting smaller goals actually can help achieve a bigger goal, and make it feel less overwhelming. That is something I will be taking away from the SMART goal process." At the conclusion of the research project, 18 students agreed that goal setting was helpful. The students exhibited a greater sense of agency by knowing how and when to use SMART goals to help them take action in their learning process.

## **An AI Chatbot Supports Girls in the Goal Setting Process but is not a Replacement for the Teacher**

Students look to teachers for guidance in the classroom. As AI becomes increasingly prevalent, students are being exposed to additional AI integration into the programs and websites they use for educational purposes. Many students felt they received mixed messages about AI use from our previous lessons and from other teachers. They were a little surprised that they were being instructed to use it in a classroom setting. For multiple students, this was their first experience using an AI chatbot. Many students shared that they were skeptical about AI at first, but after the research project concluded, they were a bit more open-minded to using it in the classroom. After two goal setting sessions with SMARTie, one student observed “this is actually a tool. And I can see myself using it beyond the classroom.”

Despite being open to using an AI chatbot, students still valued the importance of teachers. During our class discussion, multiple students noted that they preferred guidance from a teacher, rather than a chatbot. They valued the personal relationships built between student and teacher. One student explained “I really enjoy talking to teachers more because they know me at a more personal level, and they know things about me that, like, an AI won't understand.” Another student responded, “AI doesn't have, like, emotion, but I feel like that's one of the biggest parts of why I would want, like, a human teacher.” This student elaborated to explain: “Because no matter what you do, like, emotion pretty much always influences your choices and what you do ... but also the goal setting process.”

Other students countered that they preferred an AI chatbot instead of a teacher, depending on the circumstances. For some students, it depended on the content they were sharing. A few students mentioned that they would prefer to use a chatbot to set goals that were more personal. Some students preferred a chatbot because “with an AI, it's just, they kind of

don't have emotion" and "it just feels more straight to the point." In addition, multiple students found the chatbot to be a useful tool for keeping a record of their conversation.

Teachers offer a valuable perspective in the classroom. In our discussion, students shared that they valued their relationships with teachers and felt that it would be difficult to replicate the same experience with a chatbot. When asked what would improve the goal setting process, Student Q responded, "I feel like I would have a better goal if I could give SMARTie the information about my project and also my learning style, and have it help me navigate it a bit more with suggestions." Despite showing preference for teachers in the classroom, however, students saw the value in using AI as a learning tool. Multiple students agreed it was beneficial to learn how to work with and use AI because they will use it in future careers.

### **Iteration of the SMART Goal Setting Process Assists in Building Students' Confidence and Independence**

Repeated interaction with the SMART goal setting process led to more students feeling confident in creating a SMART goal. Most students discovered that after two sessions with SMARTie, they were familiar with the process and could set a SMART goal on their own. Student S explained, "I don't feel like I would need to use SMARTie again because ... it's good for when you're learning how to set a SMART goal and going step by step through the process. But I have that pretty much down in my brain now because we've done it so much."

In our final class discussion, a majority of students agreed that using SMARTie increased their confidence in creating SMART goals. Multiple students felt the chatbot's assistance through multiple sessions guided them toward a better understanding of the process, leading to more independent goal setting. One student concluded "now that we've spent time working on it, I feel more confident" in setting a goal without using SMARTie." However, a few students still preferred the guidance of a tool. Students shared that having the chatbot assist them made them feel less alone.

In our final class discussion, a few students commented that using the SMART goal process could be useful in the future. They believed they could adapt it to their own goal setting strategy, or to help them reframe goals to make them more achievable. In a recorded video reflection, one student mentioned setting more goals for herself outside of class since the beginning of this project. The student interactions with the chatbot affirmed their level of confidence in being able to set SMART goals independently. "I feel like SMARTie has really taught me how to make a SMART goal and how it should be set up and what each part is, which I think has really made me more confident to set them."

### **Conclusion**

The results of this study suggest that using a customized AI chatbot increased 8th Grade students' confidence in creating SMART goals in computer science. The chatbot's guidance ensured students constructed a goal that met the SMART criteria. Many students liked having an assistant in the goal setting process; however, students experienced challenges with SMARTie, including the chatbot's tone and repetitive phrasing. Students were also skeptical about the chatbot's ability and felt that it did not truly understand them as learners. These challenges suggest that a chatbot can be a useful tool in the classroom, but that students continue to value teacher assistance and feedback.

The iteration of goal setting was crucial in having students better understand SMART goals. Due to time constraints, students went through three cycles of the goal setting process during the semester. For future studies, additional cycles would be beneficial for students to master the creation of SMART goals. In addition, the language and tone of the chatbot play a large role in student engagement. Students had a more positive attitude towards SMARTie when they felt the chatbot was working with them, instead of against them. The chatbot settings would need further refinement for future studies.

While most students experienced an increase in confidence with setting SMART goals, other students still doubted their abilities. This study highlights how an AI chatbot can be a useful tool, but its usefulness depends on its settings and student acceptance. Students seek guidance and support in the classroom, and teachers are instrumental in providing both. Finding the proper balance between teacher support and chatbot assistance can help support students and increase their agency and confidence in SMART goal setting.

Future research should continue to explore the effectiveness of chatbots in an educational setting, particularly in middle schools. Generative AI is an evolving technology that should be carefully monitored in the classroom. Using a chatbot to assist with goal setting is only one application; there are countless others. Additional research will be necessary to determine how this technology will truly impact education.

### **Reflection**

As a computer science teacher, I am consistently using and teaching others about technology. However, this action research experience helped me step back from technology and put more focus on my relationships with my students. Although we used an AI chatbot, Chromebooks, Google Forms, and WeVideo reflections during this experience, simply talking with my students was the biggest highlight for me. My students offered honest and thoughtful feedback about what made them feel confident and supported in their learning. Their insight has inspired me to reflect on how I can improve my teaching practices to better serve my students.

My 8th Grade students are digital natives; they are comfortable with online communication and are typically early adopters of new technologies. However, their opinions and thoughts about artificial intelligence surprised me. There was a mix of excitement and ambivalence at being the first students in our middle school to use AI in the classroom. For some, this was their first experience interacting with a chatbot. Those who had used a chatbot

expressed uncertainty at how it would work in a classroom setting. Despite these feelings, the students were enthusiastic participants in my research project.

By the end of this intervention, students learned to use the AI chatbot as an additional technological tool. Some students enjoyed using this tool for setting goals, but others preferred alternative methods. I was delighted to hear students share how much they valued their relationships with their teachers. This invaluable student input will be taken into consideration as the middle school faculty look ahead to how we want to integrate AI into our curriculum. Just because this technology exists does not dictate that it must be used in the classroom. The middle school years are an important time of growth and development for students. Students are learning skills that allow them to be independent thinkers, makers, and creators. It would be detrimental to allow AI to distract students from true learning and reaching their full potential.

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