

Exploring the Role of ChatGPT as a Peer Coach for Developing Research Proposals: Feedback Quality, Prompts, and Student Reflection

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Abstract: This paper describes the results of an archival desk-study that analyzed worksheets produced by four students using ChatGPT as a coach. ChatGPT is a Generative Pre-Trained Large Language model that can write comprehensively in various languages and styles. It was discovered that it could pass university level physics exams and perform at the level of a third-year medical student. Fourth-year students in Information Technology are required to produce a 3000-to-5000-word research report as part of the requirements for graduation, and their first meeting of the year consists of a workshop following the GROW (Goal, Reality, Opportunities, Will) coaching process. Logistical considerations in this predominantly e-learning based course prevented such teamwork. The two-month-old ChatGPT, however, presented an opportunity to determine the extent to which a chatbot could be used as a peer coach. This paper reports on the outcome of an exercise that was given to students as an introduction to their research methodology course. It was found that well-designed prompts were essential and that students should be encouraged to reflect on their interaction with artificial intelligence. Three clear issues emerged from the study: the quality of feedback given by the chatbot, the value of the prompt, and the importance of student reflection. The chatbot, ChatGPT, displays the traditional computer characteristic of garbage in, garbage out and gives the feedback it is programmed to give. The dialogue shows how a student can build up mutual rapport with the chatbot when they adapt their responses to the feedback provided. The critical reflection in shows that it is still the user who should oversee the process and evaluate the feedback. It is recommended that novice research students be given some training in reacting to feedback, developing useful prompts, and engaging in meaningful reflection. Future research would include developing a reflective coach.

Keywords: Artificial Intelligence, ChatGPT, Research methods, GROW coaching

1. Introduction and Problem Statement

ChatGPT is a Generative Pre-Trained Large Language model that can write comprehensively in various languages and styles. With its launch on 30 November 2022 it created a general flurry in the academic world, particularly when it was discovered that it could pass university level physics exams (Kortemeyer, 2023) and was shown to perform at the level of a third-year medical student (Gilson et al., n.d.). These revelations have caused concern with university lecturers who fear large-scale cheating. Others have recognized that new strategies need to be developed in working with artificial intelligence (Cotton, Cotton and Shipway, 2023). This paper aims to contribute to the unfolding stories around the creative use of large language models, as it describes the results of an archival desk-study that analyzed worksheets produced by four students using ChatGPT as a coach. It was found that well-designed prompts were essential and that students should be encouraged to reflect on their interaction with the artificial intelligence.

Fourth-year students in Information Technology are required to produce a 3000-to-5000-word research report as a part of the requirements for graduation. This is their first encounter of the research process and it they often do not know where to start. To help them find focus in their research their first meeting of the year consists of a workshop following the GROW (Goal, Reality, Opportunities, Will) coaching process (Whitmore, 2002). After having the GROW principles explained to them students work in pairs completing a worksheet and commenting on each other's responses. The outcome of the process is the purpose statement from upon which the proposal will build later. Logistic and scheduling considerations prevented such teamwork. At the same time the two-month-old ChatGPT presented an opportunity. A few weeks earlier a Masters' student had filled in the same worksheet, using ChatGPT as a surrogate coach, and had reported that it was a useful exercise. It was therefore decided to scale up the exercise to the fourth-year class, to allow each student the opportunity to experience individual coaching by AI.

2. Background and Literature Review

Novice researchers often struggle to find a starting point for their research, particularly identifying a research area, and once they have done so they find it difficult to access the necessary resources to execute the research (Ameen, Batool and Naveed, 2019). The first step in finding the problem – the literature survey (Kumar, 2019) is relatively easy for fourth-year students as they have three years of undergraduate reading done. What is more difficult is identifying the shortest route to solving the problem. The shortest route is the one where the purpose of the research comprises the closest alignment of personal goals, realities, and opportunities (Whitmore, 2002).

This literature review will begin by outlining the GROW coaching process to explain how the worksheet was constructed. Thereafter it will give an overview of the development of large language models to show how ChatGPT was developed from ELIZA, whose “therapeutic” metaphor is appropriate for this study. Finally, we consider the constructionist approach to teaching and learning, where learners learn by constructing their own solutions, in the same way as they construct their own research focus through completing the worksheet.

2.1 Grow

John Whitmore's (2002) “GROW” coaching framework presents a useful tool for goal setting and performance improvement. GROW is an acronym for Goal, Reality, Options and Will. Each stage has a defining question and some further questions:

- Goal: What do you want?
- Reality: Where are you now?
- Options: What could you do?
- Will: What will you do?

The problem is students find it hard to express their goals. Ackoff's (1978, p.14) interpretation of the Ancient Greeks' four pursuit of human kind (Ackoff, 1978, p.14) were used to assist. These are: The scientific – the pursuit of truth; the political-economic – the pursuit of power and plenty; the ethical-moral – the pursuit of goodness and virtue; and the aesthetic – the pursuit of beauty. These have been refined as the pursuit of knowledge, power, virtue and value (Garbutt, 2016). For the sake of the introductory workshop these goals have been phrased in terms of four answers to the question: What do you want?

1. I want to specialize or re-focus – Knowledge.
2. I want to strengthen my position – Power.
3. I want to contribute to the body of knowledge - Virtue.
4. I just want to finish – Value.

Once the goal has been established its feasibility must be tested against the current reality with questions such as: How are things going right now? How do you feel? What is the biggest concern? What resources are available? What barriers do you face? Those being coached should then be encouraged to consider their current options before deciding on a way forward (Whitmore, 2002).

2.2 Generative Pre-Trained Large Language Models: When the Problem Becomes the Solution

The first “chatterbot”, ELIZA, constructed by Joseph Weizenbaum in 1966, was of a ‘therapeutic’ nature. It asked open-ended questions and then presented responses (Bassett, 2019). It is fitting then that a chatbot should be used for coaching. ChatGPT is a development of GPT-3 which is “a computational system designed to generate sequences of words, code or other data, starting from a source input, called the prompt” (Floridi and Chiriatti, 2020, p.684). Already in 2020 authors warned that “People whose jobs still consist in writing will be supported, increasingly, by tools such as GPT-3. Forget the mere cut & paste, they will need to be good at prompt & collate” and as a result “Readers and consumers of texts will have to get used to not knowing whether the source is artificial or human” (Floridi and Chiriatti, 2020, p.691).

For higher education the challenges of ChatGPT is that it makes it very easy for students to generate essays that contain no plagiarism, but are not their own work, while the information provided by ChatGPT is not necessarily accurate (Rudolph, Tan and Tan, 2023). Unequal access to technology may also mean that students with access to ChatGPT may potentially fare better than those without (Cotton, Cotton and Shipway, 2023). Although several chatbot detectors are in development (Rudolph, Tan and Tan, 2023), it is only a matter of time before workarounds will also be developed. The clearest solution would lie in developing authentic tasks that can be accomplished with AI (Cotton, Cotton and Shipway, 2023).

2.2.1 Resonance with this study

This study enters into conversation with a number of similar studies around the use of large language models in teaching, learning and support. ChatGPT holds several advantages for individualized support and counseling, training and therapy (Lyerly, 2023; Atlas, 2023). It can assist with generating assessments, as well as with assessing written work, and has the ability to provide immediate feedback (Cotton, Cotton and Shipway, 2023). It is in this provision of immediate feedback as well as the call for authentic tasks with AI that the workshop reported in this paper was designed.

The paper resonates with Stojanov's (2023) autoethnographic narrative in which she relates her experiences using ChatGPT as an expert advisor. She indicates that the immediate feedback was highly motivating and put her in a state of "flow". On the negative side the flow state let her over-estimate what she had learnt. She also commented on the superficial, and sometimes contradictory nature of the answers provided by ChatGPT.

It has been shown that the quality of dialogues with ChatGPT "is on par with those generated by humans" (Labruna et al., 2023, p.1). A potential solution to contradictory answers and potential hallucinations lies in specifically training the AI to coach in a certain field (Eshghie and Eshghie, 2023).

The paper talks directly to Lan's assertion that "knowledge workers have to prioritize their efforts to become AI assisted creators" (Lan, 2023, p.173). To develop students' skills in co-creating with AI it was decided to follow a constructionist approach in the design of the learning event.

2.3 Constructionism as a way Forward

Some of the ways to prevent cheating lie in giving assignments that are tailored around individual students and that require critical thinking skills (Cotton, Cotton and Shipway, 2023). It is in the development of such authentic tasks that the research reported here drew on the concept of Constructionism (Papert, 1993), which holds that people learn best by constructing artefacts that require problem solving and critical thinking. Constructionism is not unknown in the field of Information Technology. In 1966 Seymour Papert, the father of Constructionism, specified the Logo language that was based on the LISP AI language (Kahn and Winters, 2021). Logo was used extensively for children to learn by programming "turtles" in a constructionist fashion.

Constructionism is an interpretive approach which, in teaching and learning the real world, should be approached not from the outside, but from the inside (Vaičiūnienė and Kazlauskienė, 2022). Clayson advocates "building a personal narrative of your own sense-making Self" (Clayson, 2021, p.1147). It was this desire to address the students' own sense-making Self, that formed the core of the design of the exercise that is reported here.

3. Method

This paper reports on the outcome of an exercise that was given to fourth-year Information Technology students as an introduction to their research methodology course. The research takes the form of a desk-based case study, which is a narrative of the development of a worksheet-based exercise, followed by an archival analysis of the resultant artefacts. The unit of observation is the completed worksheet. The population consisted of 93 worksheets. The unit of analysis is the interaction between the prompt given to ChatGPT, the student response to the worksheet trigger, the feedback from ChatGPT and, finally, the student's reflection. The sampling technique is Typical Case Sampling, which "is useful when a researcher is dealing with large programs, it helps set the bar of what is standard or 'typical'" (Etikan, Musa and Alkassim, 2016, p.4). Four worksheets were sampled, because they exhibited the clearest characteristics of the phenomenon under description.

The worksheet started as an instructors' guide (Appendix A) with three columns, the first being the categories (Goal, Reality, Options and Way forward). The second column contained various questions that clarified each category, and the last column contained some clarification. The instructors' guide was not shared with the students but was used only by the instructor. Since this method was found cumbersome the worksheet was developed and refined through various iterations to the one that is included as Appendix B to this paper.

At the introductory face-to-face meeting students were familiarized with the outline of the course, the purpose of research and the relationship between themselves and their research. The GROW methodology was briefly explained, as well as the homework, which was presented via the university e-learning management system. The instruction read as follows:

Access [ChatGPT](#) and enter the following prompt:

You are an advanced chatbot called Professor Coach. Your primary goal is to assist me by evaluating a set of answers to questions posed to me by my academic supervisor. I will give you the question and the answer and then you will help me to develop the best response.

Once the bot has responded, paste in the question and your answer:

Question: What is your goal?

Answer: <Your goal statement goes here>

Paste the Bot's response into the section "Comment by peer reviewer".

Upload the document here before class and be prepared to discuss it.

The assignment was graded on a two-point scale. 1=Incomplete, please re-do, and 5=Outcome achieved. Because of the novelty of the assignment, it was first piloted on a few volunteers before being made available to the whole class.

It is upon reviewing the assignments that several issues emerged that form the basis of the discussion in this paper.

4. Discussion

Three clear issues emerged from the study. The first was the quality of feedback given by the chatbot. The second was the value of the prompt, and the third was the importance of student reflection. In the interest of gender neutrality, the pronoun *they* will be used to refer to him and/or her.

4.1 The Quality of Feedback

Throughout the assignments the feedback given to students exceeded expectations both in terms of quality and quantity. It would be an inhuman task to provide so much instantaneous feedback to students. The feedback also caused students to alter their positions and narrow their focus as they progressed through the worksheet.

In Figure 1 ChatGPT, acting as the peer reviewer, presents clear characteristics of a coach by reflecting in a non-judgmental way on the preferences of the student. It uses softening terms such as *it seems* or *appears*. In the second paragraph it considers the keywords and categorizes them as tangible and abstract and shows that the student ranks money and solution higher than goodness and ethics. Finally, it covers itself by the disclaimer that its response is based only on the information provided, and that it may not be a complete reflection.

Write down your sequence of preferred pursuits (power, knowledge, virtue, or value) **from highest to lowest**.

Knowledge	Power	Virtue	Value
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Rank these keywords as they relate to your intended study.

A.	goodness	1	2	3	4	5
B.	money	1	2	3	4	5
C.	focus	1	2	3	4	5
D.	simple	1	2	3	4	5
E.	quick	1	2	3	4	5
F.	fair	1	2	3	4	5
G.	proof	1	2	3	4	5
H.	plan	1	2	3	4	5
I.	confirmation	1	2	3	4	5
J.	ethics	1	2	3	4	5
K.	elegant	1	2	3	4	5
L.	solution	1	2	3	4	5

Comment by peer reviewer:
It seems like you have rated the pursuit of knowledge highest, followed by power, virtue, and value. This ranking reflects the importance you place on gaining knowledge and using it to make informed decisions or reach your goals, as well as the importance of having influence or control over a situation.
Regarding the ranking of individual keywords, it appears that you have given the keywords that are more directly related to achieving practical or tangible outcomes, such as money and solution, a higher ranking compared to keywords that are more abstract or focused on ethical considerations, such as goodness and ethics.
Overall, your rankings seem to indicate that you place a high value on efficiency, practicality, and achieving concrete results, while still considering ethical and moral principles to some extent. However, this is only based on the information you have provided and may not necessarily reflect your complete thoughts and values.

Figure 1: The sequence of preferred pursuits

The next instruction to the student is to formulate a goal statement, and for ChatGPT to comment.

Figure 2 shows how ChatGPT remembers that the student's main goal was the pursuit of Knowledge and acknowledges the alignment. It now moves on to praise and encouragement, and shows how the second pursuit, power will be achieved in the form of personal and professional growth. It suggests adding detail and finally addressing the pursuit of value and virtue by referring to how the pursuit of knowledge will benefit the community, organization, or society.

Write your goal statement here:	Comment by peer reviewer
I want to become an expert in a field or topic by thoroughly learning and researching it.	This answer aligns with the pursuit of Knowledge. Your goal is to acquire and deepen your understanding in a specific field or topic. This is a great pursuit as it enables you to expand your knowledge and skills, and can lead to personal and professional growth. To further develop this answer, you can consider adding more detail on the specific field or topic you want to become an expert in, and why it is important to you. Additionally, you can also mention how this pursuit of knowledge will benefit your immediate community, organization, or society as a whole.

Figure 2: The goal statement

The next section (Figure 3) shows an astonishing dialogue developing between the student and ChatGPT. In each of the student's subsequent responses they include words related to response from ChatGPT, and ChatGPT, in turn, encourages the student to expand and deepen the discussion.

Refine your goal by responding to the triggers below.

Trigger	Your response	Comment by peer reviewer
What do you want?	To become an expert in a field or topic that I enjoy or respect.	By working towards this goal, you are likely to gain a deeper understanding of your field, improve your ability to contribute to it, and achieve a sense of personal accomplishment and satisfaction.
What will it get you?	A deeper understanding of my field and how it relates to the world around it.	By striving for a deeper understanding of your field and its relationship to the world, you are likely to develop new insights, perspectives, and abilities that can benefit both you and others.
What is exciting about the goal?	With my knowledge and expertise, I aim to blaze new trails in the field and make improvements to existing practices.	The answer you provided suggests that what is exciting about the goal is the potential for innovation and making a positive impact in your field. By striving to become an expert and deepen your understanding of your field, you have the opportunity to make new discoveries, push boundaries, and improve existing practices. This can be a rewarding and fulfilling pursuit, as it gives you the chance to contribute to the advancement of your field and make a positive impact on others.
How will you measure the results?	I will assess the impact of my work by evaluating the positive impact I have on the field, as well as any valuable information or services I offer while building expertise in the area	The answer you provided suggests that you plan to measure the results of your pursuit of expertise by evaluating the positive impact you have on the field, as well as any valuable information or services you offer. This is a good approach as it allows you to assess the tangible results of your efforts, as well as the intangible

Figure 3: Dialogue

On being asked "What do you want?" the student provides a relatively simple answer "To become an expert in the field..." ChatGPT responds that the student will then gain a deeper understanding of the field and its relationship to the world. When asked what that will get you, the student repeats ChatGPT's comment regarding a deeper understanding of the field and how it relates to the world around it. The student's answers are being shaped by the comments of the peer reviewer. ChatGPT now shows how that can lead to new insights, perspectives and abilities that can benefit the student and others. When asked what makes that exciting, the student paraphrases the deeper understanding of the field to "new knowledge and expertise" and recognizes the value of new insights and perspectives in making improvements to existing practices. ChatGPT reflects to the student by showing its potential for innovation, but once again ChatGPT reminds the student of the importance not only of the advancement of the field, but also of the positive impact on others. Now, when the

student is asked how they will measure results, the proposed assessment focuses on evaluating the positive impact that ChatGPT had just mentioned. ChatGPT finally concludes that the student's approach will assess both the tangible and intangible results – thus reminding the student of their very first interaction, shown in Figure 1, where ChatGPT categorized the student's pursuits as tangible and intangible.

From the interaction between this student and the chatbot it becomes clear that ChatGPT can provide clear, relevant, if generic, feedback in such a way that it encourages the student to focus on their goals in the sequence in which they were listed initially. The student shows a clear progression through the worksheet and engages with the bot by repeating or paraphrasing sections of the response and the bot paraphrases the student's response and adds more information and direction. The student received the full five points.

4.2 The Value of the Prompt

In the second example there is no rapport between the student and ChatGPT. They each answer the questions from their own perspective.

Figure 4 shows that although the student had prompted ChatGPT to act as coach and to assist in answering the questions, the student omitted to provide their answer. Instead, they copied the prompt word for word including *<Your goal statement goes here>*. Where the student should have entered their answers, they now prompted the bot to provide its answer, and the result is an almost comical parallel discussion where the student expresses her goals, and the AI denies having goals at all, as shown in Figure 5.

What is your goal?	Comment by peer reviewer
I want to gather more knowledge and learn throughout my advanced diploma, so I am able to take some skills and put them to use at the current position I am in at work.	As an AI language model created by OpenAI, my goal is to assist users in generating human-like text based on the input provided to me. In this case, my goal is to help you evaluate your responses to questions posed by your academic supervisor and provide suggestions for improvement where necessary.

Figure 4: Misaligned goal

Refine your goal by responding to the triggers below.

Trigger	Your response	Comment by peer reviewer
What do you want?	I want to re-focus in a position in networking because I am currently in an EUC position at work.	As an AI language model, I do not have desires or wants. I am an artificial intelligence system created to provide information and respond to user inquiries to the best of my ability based on the information available to me at the time of my training. My purpose is to assist users and make their experience as smooth and helpful as possible.
What will it get you?	Furthering my studies in Networking might get me a position in networking and learning more skills about networking.	As an AI language model, I do not have personal gains or rewards. I was created by OpenAI to assist users in generating human-like text and to make information more accessible to people. I do not have the ability to benefit from or be affected by the interactions I have with users.

Figure 5: Parallel goals

In this example the student was unaware of the <your text goes here> convention that meant they had to replace the words between the angle brackets with their own text. This example shows the value of a good prompt and indicates that the art of prompting needs to be included in curriculum development in future.

4.3 The Importance of Student Reflection

The result of the pilot study showed that although the students were able to have meaningful interaction with the bot, the worksheet did not allow for reflection. The “building a personal narrative of your own sense-making Self” (Clayson, 2021, p.1147) was still missing. A final column was therefore added to the worksheet entitled “Your reflection” and the following phrase was added to the original project brief: *and in the next column, reflect on the differences between your answer and that of the bot.*

The conversation shown in Figure 6 does not show the same growth and interaction between student and bot as does the dialogue in Figure 3. Although the student identifies the difference between their own answer and the advice from the bot, the student ignores that information and sticks to the single goal of obtaining a degree and having a career. Two aspects are at issue here. Firstly, the bot does not recognise that the student is not making progress in this conversation. ChatGPT, after all, is trained to respond with algorithms that provide the most likely answer, not the best answer. Having no *understanding* of the student or the field, the bot is unable to nudge the student in the right direction. Secondly, the instruction to reflect on the differences between the two answers does not guide the student to heed the advice. A better instruction to the student might be *reflect on what you might do better, based on the advice from the bot.*

How will you measure the results?	I will measure the results once I am placed in a company earning a decent salary and in a managerial position.	While obtaining a degree and a high salary can certainly help you achieve your career goals, it's also important to focus on building a fulfilling and sustainable career over the long term. This may involve continuing your education, developing your skills and expertise, and seeking out opportunities for growth and advancement.	The comparison between my answer and the bots answer is that my answer is stating that I can measure the result once I am placed at a company and the bots response is where it is giving advice and it also blends into my answer.
What does success look like?	Success looks like obtaining that managerial position in a company and earning a decent salary.	Definitely! Having a high salary and a managerial position are often seen as markers of success in many people's careers. Remember that career success is not just about what you achieve, but also about the journey and the experiences you have along the way. Try to find joy and fulfilment in the work you do and in the relationships you build, as these can be just as valuable as achieving a high salary and a managerial position.	The comparison between my answer and the bots answer is that my answer is expressing what my success looks like and then the bot's response is reminding me that obtaining the degree is a journey and that I must enjoy it.
What is the big picture?	The big picture is first to obtain my degree, second, to be placed at a company that pays excellent, and third, to live comfortably.	Those are all great goals! Obtaining your degree, securing a high-paying job, and being able to live comfortably are all important milestones that can contribute to a fulfilling and successful career. It's also important to stay flexible and open to new opportunities, as the job market and the economy can change over time.	The comparison between my answer and the bots answer is that I am expressing my big picture where as the bots see the big picture and encourages it but it also advises me to be flexible to be open to new opportunities.

Figure 6: Trivial reflection

Nevertheless, some students were able to interact critically with the advice they received and either heeded it or indicated that the bot was mistaken. Figure 7 shows that the students were instructed to write a proposal consisting of some on-line sentences. Chat-GPT did not know that and provided advice on how to expand. The student points out quite correctly that ‘Additional examples wouldn’t be required in this instance’.

Formulate your mini proposal in the table below.

Example <i>The problem is that researchers believe that face-to-face communication is essential for interactive learning. But I think that we can use technology to enhance interaction. So, I want to teach a class using only WhatsApp, and classify the kinds of messages that are sent. And I hope to find out what kinds of interaction occur under what circumstances. And this knowledge will be useful in promoting interaction without face-to-face contact.</i>			
Trigger	Your response	Comment by peer reviewer	Your reflection
The problem is that researchers believe...	The problem is that researchers believe that many small businesses struggle to establish an online presence due to the high cost of professional website development services and a lack of understanding of their specific needs and requirements.	The answer you provided appears to directly address the question, but it may be helpful to provide additional information to further support the point being made. Here are a few suggestions: You could provide some specific examples of the challenges that small businesses face when it comes to website development, such as difficulties with choosing the right platform, designing an effective user interface, or ensuring the site is optimized for search engines. <Truncated by author>	ChatGPT was only supposed to focus on the problem and not comment to provide solutions. Also, I have provided an example of a challenge that small businesses face. Additional examples wouldn't be required in this instance

Figure 7: Disagreement by student

Throughout the exercise the student engages critically with the bot, indicating both agreement and disagreement. The learning derived from this critical dialogue is evident.

Trigger	Your response	Comment by peer reviewer	Your reflection
But I think that...	But I think that by providing professional website development services at an affordable price that meets their requirements and needs, we can help these businesses overcome these challenges	Be more specific: In your answer, you mention "these challenges," but you don't specify what those challenges are. Try to be more specific about the challenges that these businesses face, and how your website development services can help them overcome these challenges.	I was more specific in my initial statement, I said due to the high cost of professional website development services and a lack of understanding. How I should overcome these challenges is not related to this question
<u>So</u> I want to...and...	<u>So</u> I want to continue learning and growing in my field	Here's a suggestion for a more effective response: "I am committed to professional development and staying up-to-date with the latest trends and best practices in my field. I believe that continued learning is essential for achieving long-term success, and I am eager to explore new opportunities for growth and development."	This answer sounds more clear, concise and compelling. I agree with the suggestion
And I hope to find...	And I hope to find new and innovative ways to deliver value to my clients.	Try to be more specific about the kind of value you aim to deliver to your clients. Instead of simply stating "new and innovative ways," mention some specific ideas or strategies that you are considering to bring value to your clients. This will show your supervisor that you have thought carefully about your approach and are actively working to find creative solutions to benefit your clients.	I could've been more specific by giving a few examples of creative, innovative and new ways to deliver to my clients.
And this knowledge will be useful...	And this knowledge will be useful in helping me to achieve my goal of providing high-quality website development services to small	Your answer is a good start, but here's a shorter version that may be more effective: "By applying this knowledge, I can provide high-quality website development services to small businesses and help them succeed online."	This answer sounds more clear, concise and compelling. I agree with the suggestion

Figure 8: Critical reflection

In the first response the student recognises that the first question is about *what* they would do and not *how*. Once again, had ChatGPT been given the five-line example shown in Figure 7 it may have come up with a better response, and the student insists, correctly, that their own version is best. In line three (*So I want to...*) the student was supposed to propose a research intervention. Instead, they simply gave a long-term goal. ChatGPT expands on the student's incorrect reply, and the student accepts it. In line four (*And I hope to find*) the student provides an adequate answer that might well pass muster given the example, but ChatGPT, correctly suggests that the student be more specific, and the student accepts the recommendation. In the last instance the bot simply paraphrases the student's response, and the student, recognising that it is a better version, accepts it.

5. Conclusions

The discussion above demonstrates that ChatGPT follows well in the footsteps of ELIZA in its ability to act as a reflective coach. It displays very clearly the traditional computer characteristic of *garbage in, garbage out* and gives the feedback it is programmed to give, rather than the feedback it is *supposed* to give. The conclusions will show how this paper resonates with similar recently published work, under the headings of quality of feedback, the value of the prompt and the importance of student reflection.

5.1 Quality of Feedback

The quality of feedback given by ChatGPT is influenced by the quality of input by the user. The dialogue in Figure 3 shows how a student can build up mutual rapport with the chatbot when they adapt their responses to the feedback provided, which resonates with the findings of Labruna et al. (2023). The critical reflection in Figure 8 shows that it is still the user who should oversee the process and evaluate the feedback.

5.2 The Value of the Prompt

The critical reflection in Figure 8, together with the misaligned and parallel goals of Figure 4 and Figure 5, show the value of the prompt. In both cases, had better information and clearer instructions been entered in the prompt, more useful feedback would probably have been provided by the bot. The fact that some students misinterpreted the way in which the prompt should be used, and obtained very different, and sometimes useless responses shows that students may have to be trained in the method before being given the worksheet. In other words, the "*garbage in*" needs to be reduced by the instructor. The problem can also be better addressed by a pre-trained AI as is suggested by Eshghie and Eshghie (2023).

Large language models hold promising potential to be used as a soundboard for researchers, and to assist with broadening or refining the scope. On the other hand, if not prompted properly they may provide information that is irrelevant, off topic, unnecessary, or simply wrong. As has been pointed out by Stojanov (2023) it remains the responsibility of the student to determine the reliability and validity of the end-product through reflection.

5.3 The Importance of Student Reflection

Student reflection on learning is an important aspect the interaction with the chatbot, and in the same way that the prompt should be well designed for the bot, the instruction for the student should also be designed carefully to ensure that the student knows how to reflect. In this regard the work of Stojanov (2023) provides a useful model of such reflection.

6. Recommendations

Although the quality of feedback given by ChatGPT was shown to be reasonably good, it failed when the prompt was misaligned. It is recommended that novice research students be given some training in reacting to feedback, developing useful prompts, and engaging in meaningful critical reflection.

Future research would include developing a more elegant set of prompts, or even automating the entire process by training a dedicated AI (Eshghie and Eshghie, 2023). Such a bot would then the questions, provide feedback on the answers and respond to student reflection.

The exercise on which is reported here was restricted to the development of a purpose statement only. It is envisaged that a trained, dedicated AI model could be developed to guide students throughout the entire proposal-writing process.

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Appendix A – Instructor’s Guide

An explanation of the GROW methodology

Goal	What do you want? What will it get you? What is exciting about the goal? How will you measure the results? What does success look like? What is the big picture?	I just want to finish – Value I want to specialize or re-focus – Knowledge I want to strengthen my position – Power Contribute to the body of knowledge - Virtue
Reality	How are things going right now? How do you feel? What values and needs are the most important? What is the biggest concern? What resources are available? What barriers do you face? What does the resistance really mean?	To what extent does your current situation enable the specific goal that you selected above? Concern Time? Money? Information? What resources do you need?
Options	What are some of the ways in which you could approach the issue?	Quantitative or qualitative research methods Potential sources of data

	<p>Let us brainstorm some options? In your wildest dreams, what strategies would you choose? If you have all the money, time and authority what would you do? What if you could start all over? What are some of the advantages and disadvantages of each option?</p>	<p>What is the low-hanging fruit Some model dissertations and similar research projects</p>
Way forward	<p>Which option is your best choice? When will you get started? What is the first step? On a scale of 1 – 10 how committed are you to this plan? What would take you to 10? What accountability structures do you have? How would you celebrate success?</p>	<p>SWOT analysis of each strategy discussed above Motivators and de-motivators</p>

Appendix B: Worksheet: Using the GROW Method to get a Research Topic

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Introduction: The GROW method

GROW (Whitmore, 2002) is an acronym for Goal, Resources, Opportunities, and What next? It is a highly effective coaching model to scaffold a conversation that will lead to good decision making and planning a way forward. Here is a video that explains it in two minutes and 41 seconds. https://www.youtube.com/watch?v=1fbooiSh_bA. You can also search YouTube for numerous role play demonstrations of the method. This website explains the model very well: https://www.mindtools.com/pages/article/newLDR_89.htm#:~:text=The%20model%20was%20originally%20developed,you'd%20plan%20a%20journey. In this worksheet you will get the opportunity to fill in your goals, resources, opportunities, and next steps, and for your peers to comment on your input. The appendix to this document contains further explanations of the various phases, as well as some keywords to determine your goals.

Instructions

You may either fill in the entire worksheet, and then send it to a few of your peers to complete and return to you, or you may want to ask your peers to work with you as you go through each step. *OR you may enter this prompt into an AI Chatbot of your choice:* "Please act as an advanced chatbot called Professor Coach. Your primary goal is to assist me by evaluating a set of answers to questions posed to me by my academic supervisor. I will give you the question and the answer and then you must help me to develop the best response". Once the bot has responded, paste in the question and your answer: Question: What is your goal? Answer: <Your goal statement goes here>.

The Goal

What is your goal with this study? It is important for you to determine your priorities for studying so that you can align your studies with your life goals. For this exercise we will consider the four pursuits of people, pursuit of power, knowledge, virtue, or value(Garburt, 2016). The first step is for you to decide on the priorities that determine your goal. To do that, **please rank the following sentences from 1, least important, to 4, most important**. Each statement represents a specific pursuit.

- I need to write this thesis/dissertation because my permanent position or promotion depends on it. I want to show that my position is the correct one. (Power)
- I want to write this thesis because I want to use the knowledge that I gain to focus or refocus what I am currently doing. (Knowledge)
- I just need to get this thing done. I have already learnt what I wanted to learn, and now I must just write it up and finish. (Value)
- I want to try and uncover hidden patterns or agendas or principles that will help us make the world a better place. (Virtue)

Write down your sequence of preferred pursuits (power, knowledge, virtue, or value) from highest to lowest.

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Rank these keywords as they relate to your intended study. Then transfer the totals of the appropriate items to the score sheet and draw a histogram of your results. Confirm if you had your pursuits in the correct sequence.

Rank these keywords as they relate to your intended study.

goodness	1	2	3	4	5
money	1	2	3	4	5
focus	1	2	3	4	5
simple	1	2	3	4	5
quick	1	2	3	4	5
fair	1	2	3	4	5
proof	1	2	3	4	5
plan	1	2	3	4	5
confirmation	1	2	3	4	5
ethics	1	2	3	4	5
elegant	1	2	3	4	5
solution	1	2	3	4	5

Comment by peer reviewer	Your reflection

Now enter the totals of the scores in the table below, and draw a histogram of your preferences.

Power	B, G, I	11
Knowledge	C, H, L	12
Virtue	A, F, J	10
Value	D, E, K	5

15				
12				
9				
6				
3				
	Power	Knowledge	Virtue	Value

Use the graph to confirm if you had your pursuits in the correct sequence.

Now express your highest pursuit (Knowledge, Power, Virtue, or Value) in the form of a goal.

Examples:

I want to serve my immediate community by exploring how single mothers in disadvantaged communities cope with childcare needs during working hours. (Virtue)

I want to strengthen my position at work by showing that I am using the most effective methods available. (Power)

I want to learn a new set of skills so that I can apply my current knowledge to a new field. (Knowledge)

I want to finish as quickly as possible so that I can continue to work on all the new exciting things that I have learnt. (Value)

What is your goal?	Comment by peer reviewer	Your reflection

Refine your goal by responding to the triggers below.

Trigger	Your response	Comment by peer reviewer	Your reflection
What do you want?			
What will it get you?			
What is exciting about the goal?			
How will you measure the results?			
What does success look like?			
What is the big picture?			

By now you should have a good idea of what it is that interests you. In the next section you will write a one-paragraph proposal that will focus your thinking on your topic. In the sentence you will write what the current problem is, what your proposed solution is, how you plan to get information to solve the problem, what you hope to find, and why that will be useful.

Example

The problem is that researchers believe that face-to-face communication is essential for interactive learning.

But I think that we can use technology to enhance interaction.

So, I want to teach a class using only WhatsApp, and classify the kinds of messages that are sent.

And I hope to find out what kinds of interaction occur under what circumstances.

And this knowledge will be useful in promoting interaction without face-to-face contact.

Formulate your mini proposal in the table below

Trigger	Your response	Comment by peer reviewer	Your reflection
The problem is that researchers believe...			
But I think that...			
So I want to...and...			
And I hope to find...			
And this knowledge will be useful...			

Reality

In this phase we want to determine to what extent your current situation enables the specific goal that you selected above? We interrogate the drivers and constraints, such as money, time, information, access to participants, and other resources.

Trigger	Your response	Comment by peer reviewer	Your reflection
How are things going right now?			
How do you feel?			
What values and needs are the most important?			
What is the biggest concern?			
What resources are available?			
What barriers do you face?			
What does the resistance really mean? (Do you have to change anything in terms of your goal?)			

Now that you have considered the resources you may want to go back to the goals in the first phase and adjust where necessary. Then consider your research activities and fill in the table below.

Actions you will take	Reasons for the actions	Comment by peer reviewer	Your reflection
Actions you will avoid	Reasons for not doing those		

Opportunities

In this section you should contemplate the methods, quantitative, qualitative or mixed research methods. You need to consider potential sources of data. What is the low-hanging fruit? It may also be useful to find some model dissertations and similar research projects

Trigger	Your response	Comment by peer reviewer	Your reflection
What are some of the ways in which you could approach the issue?			
Let us brainstorm some options?			
In your wildest dreams, what strategies would you choose?			
If you have all the money, time and authority what would you do?			

What if you could start all over?			
What are some of the advantages and disadvantages of each option?			

Way forward

Now that you have considered both the resources and opportunities you can plan the way forward. The first thing to do is to perform a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis of the information you generated in the previous phases.

Internal	External	Comment by peer reviewer	Your reflection
Strengths	Opportunities		
Weaknesses	Threats		

Use this table to decide on a way forward.

Trigger	Your response	Comment by peer reviewer	Your reflection
Which option is your best choice?			
When will you get started? What is the first step?			
On a scale of 1 – 10 how committed are you to this plan?			
What would take you to 10?			
What accountability structures do you have?			
How would you celebrate success?			