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IS professors' perspectives on AI-assisted programming

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Abstract

With the rapid rise in generative AI chatbots, such as ChatGPT and SQL Query Builder, there has been an increased interest in how these programs play a role in academia, specifically in higher education. The goal of this research paper is to gain an understanding on how Computer Science (CS) and Information Systems (IS) professors view these new technologies, and how they perceive they will affect academia moving forward. A survey was conducted, whereby we wanted to gain an insight into how the sudden rise of AI chatbots, specifically ChatGPT and SQL Query Builder, were playing a part in academia, and where professors believe it will lead. Our findings are discussed, and the data collected from the responses is also displayed. Finally, we conclude with a discussion on what we believe should be future areas of research with regards to this topic, based on other questions that came about as a result of our research.

Keywords: ChatGPT, SQL Query Builder, artificial intelligence, generative AI, AI-assisted programming

Introduction

With the rapid rise in generative AI chatbots, such as ChatGPT and SQL Query Builder, there has been a notable increase in students using them to complete school assignments in higher education. As the student interviewed by Woodcock describes, they used ChatGPT on many assignments that they saw as busy work and that "would take them two hours…[now]...take them 20 minutes..." and still got A's (2022). SQL Query Builder is a chatbot software tool simply used to create SQL queries, as is deduced by simple usage of the program. But what is ChatGPT? As Qadir describes, "ChatGPT is a natural language processing (NLP) model that was developed by OpenAI. It is based on the GPT (Generative Pre-trained Transformer) architecture, which was originally developed for language generation tasks such as machine translation and summarization. Compared to traditional AI useful for discriminative predictions, ChatGPT is a "generative AI that is designed to be able to generate new content or ideas and express it in real-time conversations" (OpenAI, 2022).

As these technologies continue to develop, it is crucial to consider their potential impact on education and programming. One major concern is the possibility of increased plagiarism among students using AI essay-writing systems, as noted by Dehouche (2021): "AI essay-writing systems are designed to generate essays based on a set of parameters or prompts." This means that students could potentially use these systems to cheat on their assignments by submitting essays that are not their own work (Dehouche, 2021).

"This undermines the very purpose of higher education, which is to challenge and educate students, and could ultimately lead to a devaluation of degrees." (Cotton, 2023). This issue raises questions about the

integrity of higher education and the potential devaluation of degrees if students are not challenged to do their own work. It is therefore important to examine the potential risks and benefits of AI chatbots in academic settings and their implications for the future of programming.

Another area of interest for the usage of AI chatbots is in the workforce. According to a report, it has been found that one particular user took some coding used for their job and had ChatGPT "identify the error in some code…" (Zinkula and Mok, 2023). Though the programmer did not give the full extent of the task they were working on, ChatGPT provided a second set of eyes in spotting and fixing coding errors (Zinkula and Mok, 2023). Although research of ChatGPT is fairly limited in regards to usage for coding in the workforce, there are technological advancements emerging by OpenAI, the creator of ChatGPT, whereby they will be rolling out another AI program called API: Application Programming Interface (Constanz, 2023.). According to OpenAI's API Introduction on their website, this program "can be applied to virtually any task that involves understanding or generating natural language or code." ("OpenAI API", n.d.).

As artificial intelligence (AI) continues to advance, it is natural to consider its potential implications for various fields, including programming and Information Systems (IS). One key question is whether AI chatbots, such as ChatGPT and others, will be taught and used in academia. Furthermore, there is growing speculation about whether AI chatbots could change the future of programming and IS jobs in the coming years. Lowrey explained, "For workers, the great risk is that AI technologies cause too sudden a change in what kind of labor employers want. Certain specializations might get wiped out, leaving thousands of call-center operators or marketing workers unemployed." (Lowrey, 2023). However, Lowrey stressed the benefits of having such technology in our hands, stating "productivity has languished for decades. Machines doing a little more work would have a big upside, after all." (Lowrey, 2023). While this raises concerns about the potential negative impact on employment, it is also possible that AI chatbots could have a positive impact, such as by reducing the workload of programmers and allowing them to focus on more complex tasks. As such, it is important to explore both the benefits and potential drawbacks of AI chatbots in academia and their possible impact on the future of programming and IS jobs.

Lastly, as Qadir (2022) points out, "technology often disrupts traditional practices, requiring people to adapt and consider the potential benefits and draw-backs of new technologies. In the past, researchers have questioned how Google would impact education; whether it is making us wiser or shallower (Lowrey, 2023); and if at all we need a teacher in these times." (2022). However, the use of ChatGPT still has a lot of professors worried about students cheating or just not doing their own assignments, and therefore are trying to figure out how to combat it in the classroom. On the other hand, there are some professors, such as Lawrence Shapiro, a professor of Philosophy at the University of Wisconsin-Madison, who after testing how well ChatGPT can write a paper on a topic he is an authority on, decided that it would be better to embrace ChatGPT in his classes (2023). Simply put, Shapiro describes that he can essentially either ignore the fact it is there or use it to stimulate discussions in his classes (2023). Therefore, this research aims to investigate the impact AI has on higher education, specifically Information Systems and Computer Science professors.

Methodology

As the popularity of AI chatbots in academia is a recent phenomenon, there is limited research on the topic. As such, our survey (see Appendix 1) is purely investigative. We focused on Information Systems (IS) and Computer Science (CS) professors as experts in their fields with regards to programming, Artificial Intelligence, software development, etc, to gain some understanding on the impact these AI chatbots were having on these professors in higher education. Therefore, we presented the following research questions:

1. *What concerns do IS professors hold about AI-assisted programming?*
2. *To what degree do IS professors experience anxiety towards teaching or integrating AI-assisted programming into their courses?*
3. *What perceived benefits do IS professors hold about AI-assisted programming?*
4. *To what degree do IS professors perceive AI-assisted programming will be accepted in the near future in the workplace?*

The survey included a range of questions on the professors' teaching experience, knowledge of the two AI chatbots, and their opinions on the use of these software tools in education. To familiarize the participants with the AI chatbots, and allow for better understanding of the capabilities and potential applications of these emerging technologies in the field of education, we included examples of ChatGPT and SQL Query Builder outputs to the following prompts at the beginning of the survey:

- SQL Query Builder's Response to the Following Prompt: "What's the average salary in USD for job titles containing 'Python Programming'?"
- ChatGPT Response to the Following Prompt: "Write a program that will allow the user to enter grades and credit hours for courses. The program should compute and display the user's GPA after each course is entered. It should also display the number of courses taken and the final GPA after the user is done entering course information."

To address how IS instructors view potential use of AI-assisted programming in the workplace, we adopted a technology acceptance framework. For our measures of technology acceptance, we adapted items from Venkatesh's (Venkatesh et al., 2003; Venkatesh et al., 2012) UTAUT models. We also used Venkatesh et al.'s items for anxiety measures. The UTAUT constructs we addressed were performance expectancy (PE) or usefulness, effort expectancy (EE) or ease of use, social influence (SI), behavioral intention (BI), and anxiety (ANX). Finally, due to the exploratory nature of our study, we had three open-ended items for IS instructors to comment on perceived challenges and opportunities of AI-assisted programming.

We chose IS and CS professors because we wanted to survey their expertise as they are teaching the subject matter to future programmers and developers. After doing a search of the top fifty colleges and universities using the google search engine, we found fifty universities from across the United States for Information Systems and Computer Science programs, we collected about forty emails for each department in each institution for faculty, including professors, assistant professors, lecturers.

We conducted the survey in February 2023. Out of the roughly 2,000 professors that were emailed, 110 professors responded to our survey. As shown in Table 1, 86% (*n*=95) reported that they taught undergraduate courses, and 69.1% (*n*=76) reported that they taught graduate-level courses. Participants generally had a lot of teaching experience, with 11.8% (*n*=13) having taught between 1 and 4 years; 2.7% (*n*=3), 5 to 9 years; 13.6% (*n*=15), 5 to 9 years; 26.4% (*n*=29), 10 to 19 years; and 45.5% (*n*=50), 20 or more years.

Generally, IS professors ranged in their knowledge of various AI-assisted programming tools, with 100% (*n*=110) aware of ChatGPT, 31.8% (*n*=35) aware of SQL Builder, 9.1% (*n*=10) aware of Turing, 2.7% (*n*=3) aware of Polycoder. In an open-ended item, several participants mentioned they used tools such as Bard, Co-pilot, DALL-E 2, and other AI tools. Instructors in our sample appear to have learned about ChatGPT in many ways. Of the professors surveyed, 3.6% have read articles about it, 25.5% have talked with colleagues about it, 41.8% have watched news about it, 20% have watched online demos (e.g., YouTube videos) about it, 9.1% have participated in committees or other formal work groups to discuss how to use it in the classroom. Instructors in our sample appear to have learned about SQL Query Builder in many ways. Of the professors surveyed, 57.3% have read articles about it, 24.5% have talked with

colleagues about it, 12.7% have watched the news about it, 4.5% have watched online demos (e.g., YouTube videos) about it, 0.9% have participated in committees or other formal work groups to discuss how to use it in the classroom.

Results

IS instructors hold many concerns about AI-assisted programming (see Table 1). Roughly three quarters (73.7%) believe it will lead more plagiarism or cheating. More problematic, roughly half think it could cause more profound problems for IS and CS students. About 45.5% believe it will lead to lower programming skills among those who use it, 56.3% believe is will lead to less critical thinking, and 50.0 percent believe it will lead to less creativity.

Table 1: **IS Instructors' Concerns about AI-Assisted Programming**

	n	*M*	*SD*	% Agree
AI-assisted programming will. . .				
lead to more plagiarism.	105	5.23	1.44	73.7
lower programming skills among those who use it.	106	4.39	1.60	45.5
lead to less critical thinking among those who use it.	105	4.72	1.54	56.3
lead to less creativity among those who use it.	105	4.49	1.53	50.0

Yet, IS instructors also recognize that AI-assisted programming can result in many benefits (see Table 2). Strong majorities believe it can lead to more efficiency and creativity when used wisely. For example, 70.9% believe it will lead to more efficient programming, 62.8% believe it will lead to new ways to program, and 61.8% believe it presents opportunities to brainstorm better for programming. However, just 40.0% believe it ultimately will be better aligned with client needs, and just 24.6% believe it can be used to advance critical thinking.

Table 2: IS Instructors' Perspectives about Benefits of AI-Assisted Programming

	n	*M*	*SD*	% Agree
AI-assisted programming will. . .				
Higher efficiency in programming	104	5.16	1.31	70.9
More critical thinking in programming	104	3.69	1.42	24.6
Opportunities to brainstorm for programming	104	4.89	1.21	61.8
New ways to program creatively	104	4.81	1.33	62.8
Programming better aligned with the client needs	102	4.27	1.44	40.0

IS instructors hold some views about the ways in which AI-assisted programming will be accepted in the near term by practitioners (see Table 3). IS instructors clearly believe it is high in performance expectancy, with 82.6% thinking it will be useful, 80.9% thinking it will enable professionals to complete tasks more quickly, and 77.2% thinking it will increase productivity. Roughly two thirds believe it will be easy to easy by practitioners for most of the items. For example, 67.2% say it will be easy for most professionals, and 65.4% say it will be easy to use. Roughly half (52.7%) of IS instructors believe there will be social influence to adopt it by managers and supervisors. About 56.3% believe AI-assisted programming will be used by most professors for computer programming in the near future.

Table 3: **IS Instructors' Views about Acceptance of AI-Assisted Programming in the Workplace**

	n	*M*	*SD*	% Agree
AI-assisted programming will. . .				
be useful in the workplace.	103	5.69	1.19	82.6
enable professionals to accomplish tasks more quickly.	103	5.64	1.24	80.9
increase productivity.	103	5.54	1.26	77.2
will not require a lot of mental effort.	103	4.21	1.66	40.9
will be easy to use.	103	5.08	1.34	65.4
will be easy for most professionals.	103	5.03	1.37	67.2
be encouraged by managers and supervisors.	103	4.84	1.45	52.7
be used by most professionals for computer programming.	103	4.87	1.51	56.3
be used by most teams for computer programming.	101	4.94	1.46	57.2

Generally, IS instructors hold low anxiety (see Table 4). Roughly one quarter (28.2%) are nervous about introducing it into class. About one in five (20.0%) would hesitate to teach about it in class. Just one in ten (9.1%) say it is intimidating to them.

Table 4: **Anxiety towards AI-Assisted Programming among IS Instructors**

	n	*M*	*SD*	% Agree
I feel nervous or anxious about using AI-assisted programming in my courses.	103	3.67	1.46	28.2
I would hesitate to teach about AI-assisted programming in my courses.	103	3.22	1.67	20.0
AI-assisted programming is somewhat intimidating to me.	103	2.82	1.43	9.1

In terms of policy, IS instructors hold several preferences (see Table 5). Nearly four in ten (39.1%) think policy should be guided by individual instructors. About one quarter (25.5%) think it should be guided by university policy, and roughly one in five (21.8%) think it should be guided by departmental policy. Rarely (2.7%) do IS instructors think that AI-assisted programming tools, such as ChatGPT or SQL Builder, should be banned.

Table 5: Policymaking Approach for ChatGPT and SQL Builder

	Frequency	Percent
Guided by University Policy	28	25.5
Guided by Departmental Policy	24	21.8
Guided by Individual Instructors	43	39.1
Banned by University	3	2.7
Total	110	100.0

Lastly, in order to provide more richness to the survey findings, we asked participants to respond to a few open-ended questions, specifically:

1. What do you view as the primary challenges posed by AI chat bots for programming instruction and learning? How do you expect to address these challenges?
2. What do you view as the primary opportunities presented by AI chat bots for programming instruction and learning? How do you expect to take advantage of these opportunities?
3. Generally, in what ways do you think AI-assisted programming might change computer programming? Do you think the role of computer programming instructors will change?

The respondents were asked to answer the questions to encourage higher participation and to draw out what they viewed as the most salient issues. Of the 110 participants, 78 responded.

For the first open-ended question (see Table 6), we asked "*What do you view as the primary challenges posed by AI chat bots for programming instruction and learning? How do you expect to address these challenges?***"** Eight of the responses received are shown below. As noted by the responses, the primary concerns that the professors expressed ranged from students not properly learning to how to actually incorporate the use of AI Chatbots into course curricula and. Many of the professors expressed unease that students would not be able to grasp the fundamentals of programming if they have AI chatbots at their disposal to use as a sort of crutch to do their assignments. (See #1-4). Further, some professors expressed concern with regards to academic integrity with the use of these chatbots. (See #5 & 6) Other professors believe that these chatbots are good tools but are having a hard time trying to figure out how to appropriately use them and teach about them in their own courses. (See #7 & 8)

The second open-ended question (see Table 7) asked was "*What do you view as the primary opportunities presented by AI chat bots for programming instruction and learning? How do you expect to take advantage of these opportunities?*" Nine of the responses received that are shown below exemplify those professors believe that AI chatbots will be a good tool in helping students with their assignments (see # 1-3). Other professors expressed that the chatbots could assist in automating their work for their courses (see #4-6). Other responses described the opportunity of the chatbots being used to assist as a tool in the world of programming whereby it can help push the human capability towards more creative outputs, while the tool focuses more on the parts of programming that are more mundane (see #7-9).

Table 6: What do you view as the primary challenges posed by AI chat bots for programming instruction and learning? How do you expect to address these challenges?

1.	AI Assistance may undermine a lot of approaches to formative and summative assessment, which could lead to weaker understanding of fundamental concepts.
2.	AI will facilitate students who are either lazy or do not value the educational process. "Spoon feeding in the long run teaches us nothing but the shape of the spoon."― E.M. Forster I will address this by using more personalized programming assignments and in-person paper examinations.
3.	The use of the solution without understanding is the main problem.
4.	I think AI assisted programming will be a great productivity tool. I think our challenge will be encourage students' critical thinking and to teach them enough coding so they can understand code that is generated and fix problems or side effects.
5.	Cheating on assignments and exams. Future courses will need to redesign these components in order to ensure that students don't use AI tools to solve them.
6.	Plagiarism is the biggest challenge. I will add a course policy that I retain the right to discuss a students' program at any time to make sure they wrote it on their own.
7.	Developing instructional materials and assignments for the students to reflect on the logic of the code generated as a learning tool and not as a tool to copy and paste.
8.	How to bring them into the curriculum

Table 7: What do you view as the primary opportunities presented by AI chat bots for programming instruction and learning? How do you expect to take advantage of these opportunities?

1.	AI bots can demonstrate alternative programming methods which students may not see in class. Also, AI bots could be a powerful independent study tool.
2.	AI chat bots are a good source for discovering well known algorithms. This can help students move through the conceptual part of programming.
3.	For intermediate level programmers, these tools could offer excellent learning opportunities. These students could experiment with understanding how to develop more complex code or use more advanced libraries or features by generating examples through the AI tools. This is actually a very exciting idea for the programming classroom and may give students a significant level boost in the kinds of apps and programs they can develop.
4.	Some of the general tasks such as question generation for exams and structured grading can be automated. - Student effort on work can be more stability estimated, and this would reduce the need for personal subjective judgment. - Time saved from general classroom administration can be allocated to other activities such as classroom engagement.
5.	AI chat bots can assist in quickly verifying hypotheses re: how to approach a given problem. I'm thinking of using them to assist me in answering pedantic questions or coming up with a diversified set of examples, etc.
6.	It's a great opportunity for instructors to come up with new examples, stay current, and develop their skills. If I don't know how to code something in my advanced programming courses, I have absolutely nowhere to go.
7.	AI Chatbots are the next step in the evolution of automation, in this case with auto content creation, so that we humans can push ourselves toward addressing exceptions and critical thinking based solutions.
8.	Done right, tools like this are just a natural extension of the sorts of "auto-complete" features that are already present in IDEs. Writing a SQL query, for example, is tedious. A tool like this can reduce the tedium while still having output that's simple enough to verify (by eye) for correctness.
9.	Effective AI can be like brainstorming/synergy, but without the need to just engage in that with other people. The AI may generate ideas, suggestions, opportunities, that an individual may not come up with themselves.

The last open-ended question (see Table 8) asked was "*Generally, in what ways do you think AI-assisted programming might change computer programming? Do you think the role of computer programming instructors will change?*" Nine of the responses received are shown below. With regards to the first part of this open-ended question, there is a general consensus that AI-assisted programming will change programming for the better in a sense that it will allow for better efficiencies. However, there was not a worry expressed those human programmers would become obsolete, at least not for quite some time. With regards to the second part of this question, generally the responses point towards the conclusion that AI Chatbots will not drastically, if at all, change how programming is taught to students.

Table 8: Generally, in what ways do you think AI-assisted programming might change computer programming? Do you think the role of computer programming instructors will change?

1.	AI may do to programming what automation has done to so many industries already. It can produce, maintain, enhance, etc. the work that is routine, replicable, and non-problematic. People will always be needed to work on the more unique problems, I suppose until AI reaches singularity, at which point maybe people won't be needed, but I expect to be dead of old age by then.
2.	AI-assisted programming may lead educators to focus more on problem-solving strategies, testing, code reading, and soft skills (e.g., communication, and time management), compared to code writing.

3.	AI-assisted programming will certainly change computer programming in a big way such as assisting programmers to improve their code quality and efficiency. It is possible that computer programming instructors may hand over some of their responsibilities to chat bots such as office hours.
4.	Coding will become a faster process, but the human programmer still needs to understand how to write the code, so I don't think the role of instructors will change much.
5.	Eventually, it may work like code libraries now work, you'll be able to incorporate its code into original code that you write, without much thought. Example: Most of us currently don't write our own sqrt functions. We use sqrt from a math library. 30-35 years ago, we used "code generators" to generate electronic insurance claim forms. There was some amount of programming done by humans. This essentially got incorporated into "boilerplate code" for each insurance company/agency (e.g., Blue Cross/Blue Shield, John Hancock, Medicare, Medicaid, etc.) for each state (e.g., Indiana, Illinois, Michigan, Wisconsin, etc.). The role of computer programming instructors will change. As these tools get more reliable, "computer programming" might start concentrating more on problem solving and algorithm development.
6.	How to ethically and productively use AI in programming. Maybe AI should provide the backbone (foundations) and programmers should learn how to supplement this backbone.
7.	I don't think it will dramatically change programming instruction, though I do think it will change the field of programming (more high-level big-picture coordination, less simple programming and fewer job opportunities as a result)
8.	I think AI-assisted programming is here to stay, and developers in industry will absolutely use this and tools like it. I don't think it will replace the need for all developers. They will still need to know how to integrate generated code, what questions to ask to get correct generated code, etc. I see it as a way to increase development speed. Since it will be used in industry, instructors who teach computer programming will absolutely need to learn how to use it effectively and then show the best ways to use it to their students. It may take some time to learn what will work best, but it will definitely change the way computer programming is taught.
9.	It will not change...Just as computers did not replace humans in most jobs. AI tools will be used as teaching tools just as students watch YouTube videos to get help.

Conclusion

Our findings highlight both the benefits and potential risks of AI chatbots in academia. On the positive side, students are using these technologies to complete assignments more efficiently, and they have the potential to assist in identifying errors in coding tasks in the workforce. However, there are concerns about the possibility of increased plagiarism among students, which could undermine the integrity of higher education. Moreover, there are concerns about the potential impact of AI chatbots on employment, with some fearing that certain specializations might become obsolete, leading to job losses in certain fields.

As technology continues to disrupt traditional practices, it is important for academia and the programming community to carefully consider the implications of AI chatbots. While they have the potential to increase productivity and efficiency, there is a need to establish guidelines and ethical frameworks to prevent misuse and ensure academic integrity. Further research is needed to explore the long-term impact of AI chatbots in academia, including their effects on student learning outcomes, the job market for programmers and IS professionals, and the overall quality of education.

In conclusion, AI chatbots are rapidly changing the landscape of academia and programming, and it is essential to closely monitor their development and consider their implications for the future. By understanding the potential benefits and risks of these technologies, academia and the programming community can proactively navigate the changing landscape of AI chatbots and ensure their responsible and ethical use in higher education and the workforce.

References

Cotton, D., Cotton, P., & Shipway, J. R. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *EdArXiv*. https://doi.org/10.35542/osf.io/mrz8h

Lowrey, A. (2023, January 20). How ChatGPT will destabilize white-collar work. *The Atlantic*. https://www.theatlantic.com/ideas/archive/2023/01/chatgpt-ai-economy-automation-jobs/672767/

OpenAI API. (2022). *Introduction*. https://platform.openai.com/docs/introduction/key-concepts

Qadir, J. (2022): Engineering education in the era of ChatGPT: Promise and pitfalls of generative AI for education. *TechRxiv*. https://doi.org/10.36227/techrxiv.21789434.v1

Shapiro, L. (2023, February 6). Why I'm not worried about my students using ChatGPT. *The Washington* Post. https://www.washingtonpost.com/opinions/2023/02/06/college-students-professor-concerns-chatgpt/

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425-478. https://doi.org/10.2307/30036540

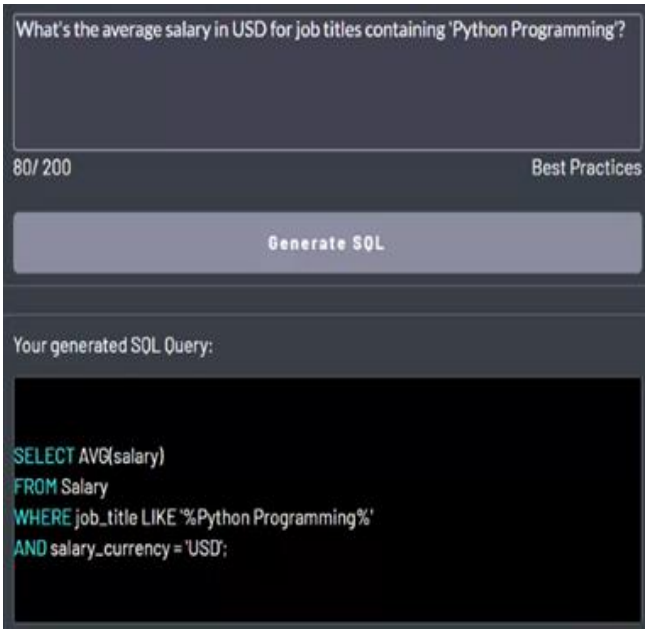
Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly, 36*(1), 157-178. https://doi.org/10.2307/41410412

Woodcock, C. (2022, October 14). Students are using AI to write their papers, because of course they are. *VICE*. https://www.vice.com/en/article/m7g5yq/students-are-using-ai-to-write-their-papers-because-of-course-they-are

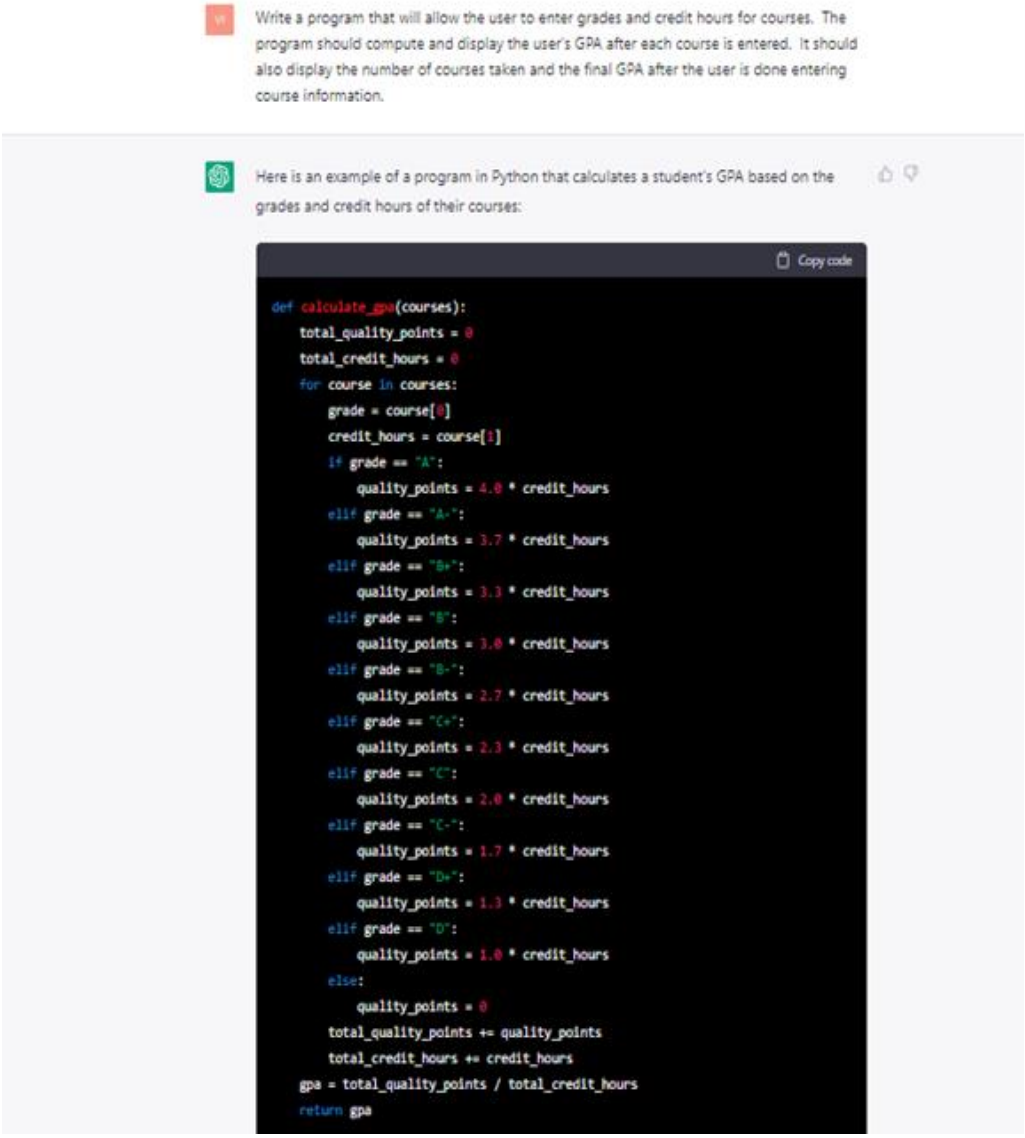
Zinkula, J., & Mok, A. (2023, February 4). 7 ways to use CHATGPT at work to boost your productivity, make your job easier, and save a ton of time. *Business Insider*. https://www.businessinsider.com/how-to-use-chatgpt-at-work-job-save-time-ai-2023-2

Appendix 1 [Survey]

Your Views on AI-Assisted Programming
SQL Query Builder's Response to the Following Prompt: "What's the average salary in USD for job titles containing 'Python Programming'?"



ChatGPT Response to the Following Prompt: "Write a program that will allow the user to enter grades and credit hours for courses. The program should compute and display the user's GPA after each course is entered. It should also display the number of courses taken and the final GPA after the user is done entering course information."



Write a program that will allow the user to enter grades and credit hours for courses. The program should compute and display the user's GPA after each course is entered. It should also display the number of courses taken and the final GPA after the user is done entering course information.

Here is an example of a program in Python that calculates a student's GPA based on the grades and credit hours of their courses:

Copy code

```
def calculate_gpa(courses):
    total_quality_points = 0
    total_credit_hours = 0
    for course in courses:
        grade = course[0]
        credit_hours = course[1]
        if grade == "A":
            quality_points = 4.0 * credit_hours
        elif grade == "A-":
            quality_points = 3.7 * credit_hours
        elif grade == "B+":
            quality_points = 3.3 * credit_hours
        elif grade == "B":
            quality_points = 3.0 * credit_hours
        elif grade == "B-":
            quality_points = 2.7 * credit_hours
        elif grade == "C+":
            quality_points = 2.3 * credit_hours
        elif grade == "C":
            quality_points = 2.0 * credit_hours
        elif grade == "C-":
            quality_points = 1.7 * credit_hours
        elif grade == "D+":
            quality_points = 1.3 * credit_hours
        elif grade == "D":
            quality_points = 1.0 * credit_hours
        else:
            quality_points = 0
        total_quality_points += quality_points
        total_credit_hours += credit_hours
    gpa = total_quality_points / total_credit_hours
    return gpa
```

1. What Classes Do You Currently or Have Taught in the Past? Check ALL THAT APPLY.
    - Computer Programming
    - Database Administration
    - Computer Networking
    - ERP Systems
    - System Analysis and Design
    - Other

2. What level of instruction do you teach?
    - Undergraduate
    - Graduate
    - Both

3. How many years have you taught in higher education?
    - 0
    - 1
    - 2
    - 3
    - 4
    - 5 to 9
    - 10 to 19
    - 20 or more

4. What kind of AI have you heard of? CHECK ALL THAT APPLY
    - ChatGPT
    - Open AI Model
    - Polycoder
    - SQL Query builder (AI2sql)
    - Turing by Borealis AI
    - Other

5. How have you learned about ChatGPT? Check ALL THAT APPLY.
    - I've read articles about ChatGPT.
    - I've watched news about ChatGPT.
    - I've watched YouTube (or other online sources) demos about how to use it.
    - I've talked informally with colleagues about it.
    - I've participated in committees or other formal work groups to discuss how to use it in the classroom.
    - I've helped create policy about how to use it.
    - I've used and experimented with it.
    - Other (please specify)

6. How have you learned about SQL Query Builder? Check ALL THAT APPLY.
    - I've read articles about SQL Query Builder.
    - I've watched news about SQL Query Builder.
    - I've watched YouTube (or other online sources) demos about how to use it.
    - I've talked informally with colleagues about it.
    - I've participated in committees or other formal work groups to discuss how to use it in the classroom.
    - I've helped create policy about how to use it.
    - I've used and experimented with it.
    - Other (please specify)

7. Overall, how much do you think you know about ChatGPT compared to other professors in your area? 1 -- Nothing - 5 -- A Lot

8. Overall, how much do you think you know about SQL Query Builder compared to other professors in your area? 1 -- Nothing - 5 -- A Lot
   1 - 7: Strongly Agree to Strongly Disagree
9. I am concerned that AI-assisted tools (like ChatGPT, SQL Query Builder, etc.) will…
   - Lead to more plagiarism.
   - Lower programming skills among those who use it.
   - Lead to critical thinking among those who use it.
   - Lead to less creativity among those who use it.
   - Reduce the level of authenticity in programming.
10. I think AI-assisted programming tools (like ChatGPT, SQL Query Builder, etc.) may lead to benefits such as . . .
   - Higher efficiency in programming
   - More critical thinking in programming
   - Opportunities to brainstorm for programming
   - New ways to program creatively
   - Programming better aligned with the audience needs

11. Which of the following statements comes closest to your view of policy making for AI-assisted programming platforms such as ChatGPT and SQL Query Builder?
   - These tools should be banned for university students as a matter of academic integrity.
   - The use of these tools should be guided by policy developed at the school or university level.
   - The use of these tools should be guided by policy developed at the department level.
   - The use of these tools should be guided primarily by policy developed by individual instructors.
   - Other (please specify)

12. Now think about your expectations of how AI-assisted programming will be used in the workplace in the future.
   - *In the near future (within years), AI-assisted programming will . . .*
     - be useful in the workplace.
     - enable professionals to accomplish tasks more quickly.
     - increase productivity.
     - will not require a lot of mental effort.
     - will be easy to use.
     - will be easy for most professionals.
     - be encouraged by managers and supervisors.
     - be used by most professionals for computer programming.
     - be used by most teams for computer programming.

Now, just a few final questions. Please share your thoughts about the following (even in just three to five sentences).

13. What do you view as the primary challenges posed by AI chat bots for programming instruction and learning? How do you expect to address these challenges?
14. What do you view as the primary opportunities presented by AI chat bots for programming instruction and learning? How do you expect to take advantage of these opportunities?
15. Are you currently teaching or will teach about AI-assisted programming (e.g., ChatGPT, SQL Query Builder, etc.) in your classes this semester? If so, in what ways?
16. Generally, in what ways do you think AI-assisted programming might change computer programming? Do you think the role of computer programming instructors will change?

Thanks so much for sharing your views on AI-assisted programming. Please select "DONE" to complete the survey.