Exposure to Discussions about the Ethics of Technology in Liberal Arts College and its affect on Student's Personal Ethical Engagement with Technology

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This paper presents the findings from a subsidiary study on the methods for the ethics of technology in liberal arts colleges. This paper investigates through the qualitative analysis of semi-structured interviews the effect of the exposure to ethical discussions about technology during on participants modern interactions with digital technology. As a part of our larger study, researchers conducted a total of 34 semi-structured interviews with randomly selected alumni from the liberal arts school Wellesley College. The participants were questioned on their time and education at Wellesley as well as their current experience in the workforce and socially. Our findings were unable to suggest anything of statistical significance between the alumni's exposure to ethical discussions while at Wellesley and their modern ethical engagement with digital technology.

Additional Key Words and Phrases: Education of Ethics, Liberal Arts, Ethics of Technology

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1 INTRODUCTION

As the world becomes more and more technologically advanced, the ethical dilemmas which surround these technologies seem to increase in their difficulty as well. Despite ethical concerns always being a part of the way in which we interact with technology, it is unclear how we develop the tools we need to engage with them in a meaningful and progressive way. This study is part of the larger study on the Methods for the Ethics of Digital Technology which aims to explore how liberal arts colleges can better equip their students with the tools they need to be ethical users and creators of technology. The study focuses on a sample from the alumni community of Wellesley College, a liberal arts college. Our study, more specifically, examines the value of exposure to technology specific ethical concerns through the following question:

How does exposure to tech specific ethical discussion during alums' time in college affect their current ethical engagement with personal technology?

We decided to center our research around discussion as we believed in the importance of discussion in human development. Additionally, we depended heavily on the theory of techno-virtue ethics developed by Vallor which highlights the importance of practice in becoming virtuous. We hypothesized that by exposing students to these techno-ethical discussions, they would be more likely to have practiced applying ethical reasoning to technology. More formally, we hypothesized that alums who were exposed to ethical discussions about technology during their time at Wellesley are more likely to ethically engage with their personal technology.[**?**]

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In order to investigate our research question and test our hypothesis, we analysed the answers from a set of interviews from the sample set of Wellesley alumni interviews. We picked out questions which interrogated the ethical climate surrounding technology during their time at Wellelsey in addition to questions about their current ethical concerns about technology they regularly use today. We then coded their responses for evidence of techno-ethical discussions during their time at Wellesley as well as evidence of ethical engagement in their current interactions with technology. Our codes allowed us to create groups of participants which we were able to compare.

Our study tests for a correlation between two broad categories. The existence of techno-ethical debate in college is quite common and expected. However, by analysing its effect on alumni, it will allow us to better understand if its presence is enough. It will allow college administrators and curriculum developers to determine the importance of encouraging these debates and making more space for them on campus. Whether it be through organized class debate, spaces on online forums for discussion, symposiums, or college sponsored guest speakers, there is an opportunity here to understand if college campuses should encourage these discussions.

2 LITERATURE REVIEW

The area of research of tech focused ethical discussions in liberal arts colleges is novel and new. There is no existing published research which deals with the intersection of education, ethics, and technology in this way. However, there are existing studies from these individual disciplines which have served as helpful frameworks for this study.

2.1 Philosophical Framework for Creating Measurable Criteria in Ethics

Although there does not exist much literature on the ethics of technology, philosopher Shannon Vallor provides a detailed guide to what ethics in the realm of technology looks like in her book *Technology and the Virtues: A Philosophical Guide to a Future Worth Wanting* (2016) [**?**]. This study leverages the definition of ethical engagements to outline the dependent variables as well as Vallor's theory of moral cultivation to identify our independent variable. In Vallor's book, she reproduces the discussion of existing virtue ethics theory from Aristotle and Confucianism to present her own virtue ethics theory which is specific to the human interactions with technology.

One of the key elements from traditionally Virtue Theory in her Techno-Virtue theory is that of practice. She introduces the idea of *moral self-cultivation (66)* and *moral habituation (67)*: the idea that virtue is not something that can be learned immediately, but instead something that needs to be practiced over a long period of time. [66] We identified discussion and exposure to ethical conflict as an essential element in moral cultivation.

Vallor also defines what evidence of techno-ethical virtuosity in an individual looks like. She highlights the importance of relational understanding which requires a treatment of techno-ethical situations with flexibility in regards to one's relationships and context (76). Similarly, she expects an element of self-examination which requires a reflection of one's moral shortcomings (87). Finally, Vallor introduces the idea of moral attention which expects an acuteness of ethical awareness in relation to technology (100). The characteristics of self examination, relational understanding, and moral attention define what we use to determine as evidence of ethical engagement in our alumni's responses.

2.2 Research Frameworks for Evaluating the Effect of Ethical Conflict

COVID-19 created a heightened number of ethical conflicts throughout society. A study from the International Journal of Environmental Research and Public Health researched the effect of exposure to these ethical conflicts as a result of the environment of COVID-19 on nurses[**?**]. They point out that not only did the pandemic bring on an excess of ethical conflicts, but they also brought on new types of ethical conflicts that medical professionals had no training

or experience dealing with in the past. The study pointed out that the training for ethical conflicts for nurses were insufficient due to the scarce resources, infection risks, threats to their own families and the changes in workflow (2). Similar to our study, this study focuses on the way in which participants engage with new ethical conflicts that we do not expect for them to have existing frameworks to depend on.

The study interviewed a sample of nurses working during the pandemic and tagged their answers to identify their experiences with ethical conflict and the effects of these ethical conflicts and how this affected their methods for handling ethical conflicts. The study found that nurses who were exposed to ethical conflicts depended on coping mechanisms such as teamwork, autonomous learning, and humanization of care and peer support (17). While these behaviours do not neatly fall into what Vallor identifies as important tools for dealing with ethical conflict, the studies' comparison of exposure to ethical conflict and behaviours as a result, provides a similar and helpful framework.

2.3 Assessing the importance of discussion from Cognitive Development Theory

In her chapter Integrative Ethical Education, Darcia Narvaez discusses the debate surrounding moral education. More specifically, she assesses the theories of traditional and rational moral education and introduces a third perspective of integrative ethical education which depends on both existing theories. Her theory provides a framework for ethical education which includes elements of character formation, ethical expertise, instruction, community, and the cultivation of good characters in community mentors. One of the elements which she emphasizes as an important tool in integrative ethical education is discussions surrounding ethical dilemmas. She believes in the importance of testing students' intuitions through discussion.[?]

3 DATA AND RESEARCH METHODS

This paper is part of a larger study which investigates which parts of the liberal arts curriculum, if any, are preparing our graduates for the kinds of ethical decision-making they need to engage in modern technology. This study includes a series of subsidiary studies, including ours, which focuses on research questions which help investigate the overall goal.

4 DATA COLLECTION

Researchers across the subsidiary studies created a conglomerate protocol which allowed for each of us to investigate our individual research questions through qualitative data analysis. We conducted a total of 36 semi-structured interviews of Wellesley alumni from a wide range of demographic backgrounds.

Our sample of alums was determined by sending out requests for interviews over email to a random group of alums. All alums were explained the premise of the interviews and were given the option to opt in. Participants agreed to a consent form (see Appendix A) which included a request for consent to have their interviews recorded. All interviews were conducted by current Wellelsey college students over Zoom. Their interviews were transcribed and their data was anonymized. Using the transcribed material, we used the software Atlas.ti to analyze each transcript by tagging phrases in the participant responses for our variables.

5 ANALYSIS AND VARIABLES

Our independent variable divides our sample size for participants into two groups; those who were exposed to tech-specific discussions during their time at Wellesley and those who were not. We created the code 'tech_ethic_discussion' which is divided into the simple categorical "yes" if there is evidence in the alums answers and "no" if there was no evidence.

This variable is derived from the participants' answers to questions 6 and 8 (see Table 2). Both questions prompt the participants for descriptive responses about these discussions. Our dependent variables are supposed to inform us on how the alums ethically engage with their personal technology today. We used questions 27 and 28 to find evidence of techno-ethical engagement.

Table 1. Questions asked During Interview

Variable	Related Question	
tech_ethics_discussion: Was the participant exposed to any discussions about the ethics of technology?	Question 6	Do you recall any discussions from that time about the use of this technology among students?(Especially any controversies, worries, etc.)
	Question 8	Do you recall any discussions on ethical concerns about technology adoption from that time? It could be either in your classes or outside of them. (If in a class, tell us a bit about that class.)
tech_ethical_reasoning: Did the participant show ethical reasoning in relation to their current engagement with technology?	Question 27	What worries (if any) do you have about the companies that make/operate these products?
	Question 28	Have you ever given up using a device or app because of ethical concerns about it?

6 RESULTS

Across all our interviews, we noticed during the data collection process that several participants were eager to share their responses to questions about the relevant technology during their college experience. They were able to share their experience in a clear and accurate manner. The attention that our participants gave to this question reinforced the relevance of our research question: **How does exposure to tech specific ethical discussion during alums' time in college affect their current ethical engagement with personal technology?** However, despite the enthusiasm of our participants, there seems to be little evidence of an effect of these discussions on the participants current interactions with technology. After tagging the interviews for our variables, we found that out of the 17 participants who were exposed to ethical discussions about technology during their time at Wellesley and the 18 who didn't, 16 across both groups were able to show evidence of ethical reasoning in their current interactions with technology. Across this grouping, there was very little difference in the level of action taken in their current interactions with technology they find ethically problematic as shown by Table 2.

Similarly visual representation of our data also indicates no relevant statistical difference between those who were and who were not exposed to ethical discussions about technology during their time at Wellesley. As shown in the graphs below, there seems to be no visual difference between the two groups created by our variables.

Table 2. Grouping Analysis of Ethical Engagement Characteristics based on Participant Exposure to Tech-Ethical Discussion during their Time at Wellesley

Characteristic of Ethical Engagement	**Tech-Ethical Discussions:**	Yes	No
Ethical Reasoning: Yes		16	1
Ethical Reasoning: No		16	2
Action as a Result of Ethical Conflict:			
No Action		2	5
Some Action		7	7
Significant Action		4	5

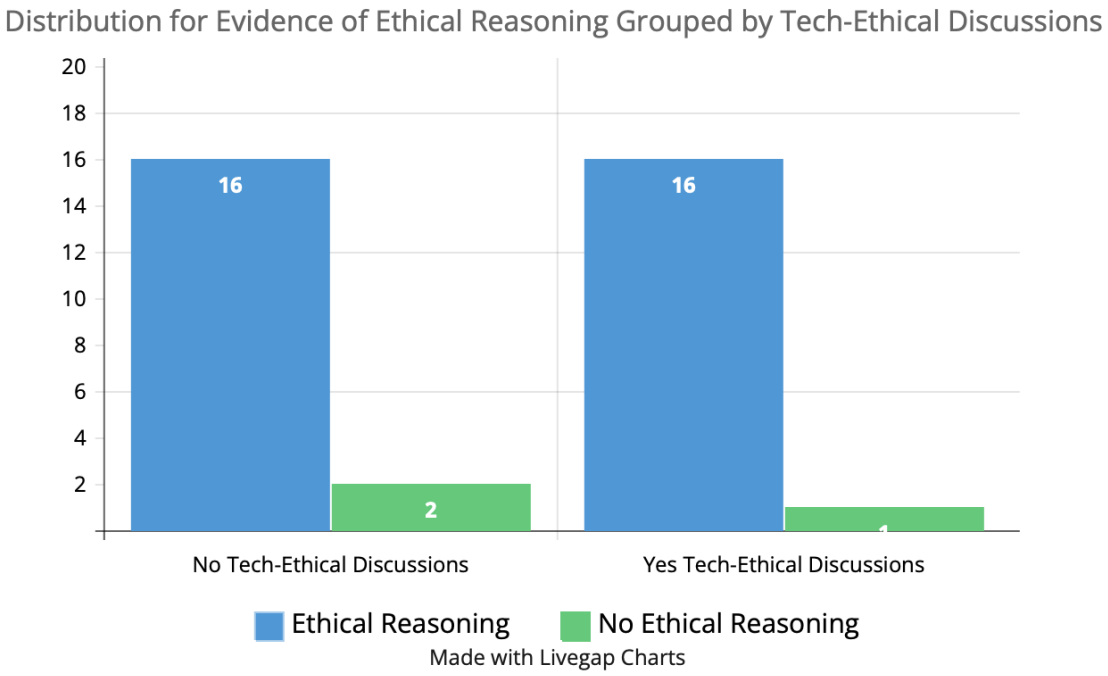

Fig. 1. Evidence of ethical reasoning found in participant response across participants who were and were not exposed to ethical discussions about technology during their time at Wellesley: from a total pool of 35 participants

6.1 Hypothesis Testing

As the values in our table accounting for ethical reasoning across both groupings includes values less than 5, it is most appropriate to evaluate the significance of our findings using Fisher's exact test. Additionally, as the ethical reasoning section of the table is assessing the difference or similarity between two groups, a significance level of .05 is appropriate. Therefore, in order to reject the null hypothesis, the Fisher's test for this table must produce a p-value less than .05.

Recall we hypothesized that alums who were exposed to ethical discussions about technology during their time at Wellesley are more likely to ethically engage with their personal technology. This produces the null hypothesis: There

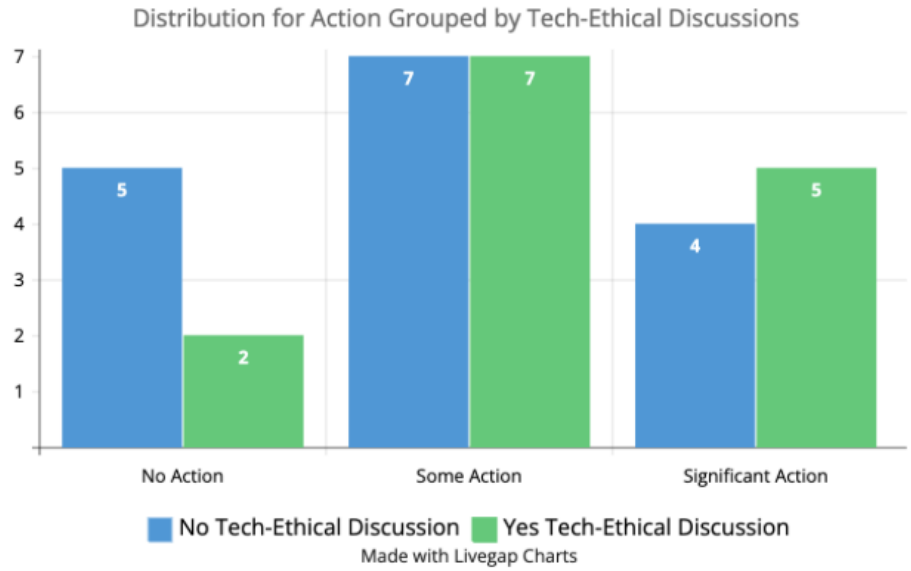

Fig. 2. Evidence of levels of actions as a result of tech-ethical conflicts found in participant response across participants who were and were not exposed to ethical discussions about technology during their time at Wellesley: from a total pool of 35 participants

is no significant difference between alumni who were and were not exposed to ethical discussions in their current personal engagement with technology. As we operationalized ethical engagement by 1) identifying participants' ethical engagement with technology in their discussion and 2) their level of action as a result of their ethical qualms with their personal technology we require p-values less than .05 to reject the null hypothesis. For the first characteristic of ethical engagement, we found that Fisher's test yielded a p-value of 1.0 indicating that the difference between the two groupings are statistically irrelevant. The second characteristic of ethical engagement, similarly was unable to provide any statistical significant difference between participants who were and were not exposed to ethical discussions about technology. The Fisher's test for the second characteristic yielded a p-value of .8. Both tests yielded p-values below the significance level of .05, therefore, we are unable to reject the null hypothesis.

7 DISCUSSION

This study aims to help educators and administrators better understand what positively contributes to student's becoming ethical users and producers of technology. The enthusiasm and accuracy that participants were able to explain the ethical controversies during their time at Wellesley hinted at some insight towards what may be part of the answer to our study's goal: discussion. In this section, I will 1) provide a framework for the importance and analysis of discussion that this study relies on 2) reflect on the results of the study and consider its relation to theoretical limitations and finally 3) consider real world implications of the findings.

7.1 Theoretical Framework

Outside of our own initial observations, discussion proved to be a recurring important tool in the moral development of children in the realm of psychology. In her chapter introducing the theory of Integrative Ethical Education, Narvaez first analyzes the existing approaches of traditional character and rational moral education. In her analysis of both approaches she highlights the importance of discussion in moral development and centers it in her own approach. More particularly she emphasizes the teaching power of in depth moral dilemma discussions in the classroom [**?**].

In her book, Vallor provides sound philosophical reasoning which supports Narvaez's emphasis on discussion. Vallor presents moral attention as a key part of what she argues makes up a techno-ethically wise individual. The idea of moral attention as a virtue of a moral individual was already identified by Aristotle. He states that in the same way that a mathematician (who is mathematically wise) is able to look at three lines all connected by points and recognize its geometric significance as a triangle, a morally wise person should be able to perceive situations in society and pick out their moral significance (100)[**?**]. Vallor argues similarly that our new techno-social world requires a techno-moral attention where individuals are able to perceive the ethical consequences and importance of the technology that they engage with.

The question remains, how does one obtain this virtue of techno-moral attention? The value of discussion as pointed out in Narvaez's chapter suggests that discussion may be a way to do so. By exposing children to discussion on the ethics of technology, they not only learn what is worthy of ethical importance in relation to technology, but also gain practice in doing so. This raises another relevant point from Vallor's book. She argues that practice is one of the only ways to become virtuous. If discussion provides this practice then it may result in an increased level of techno-moral virtuous individuals.

Theory from nursing studies also provides another possible support for this conclusion. The study of nursing includes a practice in which the nurses' exposure to ethical conflict is recorded and their reaction and behavior are recorded as well. As seen in a study done to analyse the effects of increase exposure to ethical conflicts during the COVID-19 pandemic, there is a clear correlation between the exposure the nurses had and their behavior[**?**]. In a similar way to how discussion is related to moral practice, exposure can be related as well. Exposure to ethical conflicts and their discussion (not necessarily participating in the discussion as Narvaez points out) can also be an opportunity for virtue practice.

Discussion represents an opportunity for practice to become virtuous, however our definition in our identification of techno-moral wisdom is more specific than that. Aristotle argues that moral attention extends past identification. He argues that it requires relational understanding, self examination and moral action. Vallor also extends these qualities of Aristotelian moral attention to her conception of techno-moral attention.

7.2 Results Analysis and Limitations

In our results, we found that there was no statistically significant difference between participants who were exposed to tech-ethical specific discussions during their time at Wellesley and those who were not. This may be due to some limitations in our theoretical framework. Narvaerz's framework does not exclude higher education, but does focus on younger child development. This difference in focus is not taken into account for by our framework. Additionally, Narvaez's advocates for discussion as a tool of moral education. However, her definition of discussion is much more focused than what we were coding for in our interviews. She requires a focused discussions on moral dilemmas inside the classroom which provide a much more concentrated opportunity to practice and test their intuitions.

While Vallor does place practice at the center of her theory for virtue development, there is a requirement for the context in which this practice should be happening in the educational sense. She calls for more practical spaces for techno-moral education (186). In her description of these spaces she argues against passive learning. Exposure to ethical discussion is in many ways passive learning. When we were coding this variable, we were unable to operationalize a scale of engagement with discussion because of the variance in the way that participants responded. However, the level of engagement seems to be an essential part in both Vallor's and Narvaez's theory.

More generally, our research is limited by the design of our study. Our study uniquely analyzes the responses and experiences of the Wellesley College alumni and aims to extract information about the liberal arts experience generally. Additionally, participants were reached out randomly but opted in voluntarily. This may result in a pool of participants who are already interested in ethics or technology and therefore do not represent a truly unbiased sample of the alumni community. Finally, the coding was done by one researcher and does not have a peer coder to establish the validity or bias of the coder's choices.

7.3 Future Work

The limitations of this study beg a more in depth research on values of intentional educationally motitaivated discussions on ethics. Our study was unable to find a significance of exposure to tech-ethical discussions. However, the emphasis on the intention and engagement in these discussion provides a great framework for a secondary study. Additionally, a larger study with alumni from all sort of liberal arts colleges would provide a more robust basis for data collection.

8 CONCLUSION

Based on the results from the study, we are unable to reject the null hypothesis. While this means that we are not able to draw any conclusions, this study can help direct research on the education of the ethics of technology in a certain direction. The study shows us that perhaps exposure to discussions during a liberal arts education is not significant enough to promote ethical wisdom in students. However, the discussion suggests a more in depth study of the value of discussion as well as the levels of engagement and how they can effect moral development and ethical engagement. This will allow administrators and educators to understand the impact of more focused discussions such as symposiums, guest speakers, and in class debate. Additionally, it will help educators understand the value of online chat forums and other platforms for discussion which exist in college campuses.

REFERENCES

A PARTICIPANT CONSENT FORM

Pathways to Ethics of Technology in the Liberal Arts Curriculum

This interview is being conducted by a current Wellesley College student, who is enrolled in the course "Methods of Ethics of Technology" (taught by Dr. Eni Mustafaraj (Computer Science), Dr. Julie Walsh (Philosophy) who are both currently employed by Wellesley College.) Please read this form carefully. If you decide to participate in this interview, please ensure that you understand the study completely before giving your consent.

What is this interview about? This interview is about how you perceive the presence (or lack) of ethics in decision-making around either the creation or adoption of technology. Your interviewer will also ask you to reflect on the relationship between your Wellesley College education and the formation of your own ethical stances, as well as potentially reflect on the questions you answered in our prior survey.

Who are we asking to participate? Wellesley College alums who stated interest in being interviewed through our previous survey regarding the "Pathways to Ethics of Technology in the Liberal Arts Curriculum" project.

What will you be asked to do? Initially, the interviewer will ask if it is okay to record the interview through a digital device (e.g. phone) or application (e.g. Zoom). You may decline to be recorded digitally and still participate in the interview, if you would like, though that might slow down the interview, since the student interviewers are not trained in taking notes while interviewing. The interview will contain questions in these areas:

(1) Recall or reflect on how your college education and personal experiences have shaped your own ethical stances.
(2) Share how ethical decision-making is practiced in your current or prior workplace(s).
(3) Reflect on decision-making around adoption of technology either in your personal life or workplace.

Are there any possible risks to you? There is a risk of loss of confidentiality of your information, as most of these interviews will be conducted and recorded (with your consent) on Zoom. We are taking all possible steps to preserve the confidentiality of your information (more on that below), but if you do not want to answer a question for any reason, you can skip the question or end the interview.

Will you benefit from participation? Indirect benefits to this survey include contributing to the development of ethics of technology curriculum and contributing to the intellectual growth of undergraduate students at Wellesley College and beyond.

Will participation cost you anything? This interview will take approximately 60 minutes.

Will you receive anything for participating in the survey? Participants who are interviewed will be paid up to 50 dollars, based on the length of the interview.

How will your information be kept private? The transcripts and notes collected from this interview will be anonymized before data analysis. Before the beginning of the interview, we will change your name to "interviewee [X]" on Zoom, in order to ensure anonymity in the transcription and recording process. You will be assigned a number and the transcript of your interview will only contain that number for identification purposes. Only the researchers and students in a research methods seminar co-taught by Eni Mustafaraj and Julie Walsh will have access to your anonymous interview responses. Your answers will never be published or released in any form with identifying information about you or your employer attached to it.

What will happen with your answers after this study? The anonymous (de-identified) responses collected by this interview will be retained and used by students in our research methods seminar as well as used in an aggregated form for published research or reports about this project to our funder. The data will be kept for five years, per IRB standards. The interview responses will not be used outside the scope of this project.

What if you don't want to participate or change your mind partway through? Your participation in this interview is completely voluntary and can be terminated at any point during the interview if you so choose. We will delete any recording and notes associated with the interview if you request to end the interview.

If you have questions or concerns about this interview, please contact one of the following:

- Dr. Eni Mustafaraj at eni.mustafaraj@wellesley.edu
- Dr. Julie Walsh at julie.walsh@wellesley.edu

- CJ Larkin, ’22 at clarkin2@wellesley.edu
- Human Research Protection Program (HRPP) Office at Brandeis University at hrpp@brandeis.edu or 781-736-8133. Brandeis University is the IRB record for Wellesley College.

B INTERVIEW PROTOCOL

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Table 3. Questions asked During Interview

Numbering	Text
Question 1	What did you major in at Wellesley?
Question 2	What were some of your favorite courses? Why?
Question 3	Did you take any courses at Wellesley in the Philosophy department? If yes, do you recall which ones?
Question 4	A: [If the alum was not a CS or MAS major] Did you take any CS courses? If yes, do you recall which ones? B: [If the alum was a CS or MAS major] Which of the CS courses you took either taught you the most or you still think about what you learned in them.
Question 5	What was the dominant technology for communication on campus during your time there?
Question 6	Do you recall any discussions from that time about the use of this technology among students? (Especially any controversies, worries, etc.)
Question 7	In general, how prevalent was the embrace of various technologies by the students during your time on campus?
Question 8	Do you recall any discussions on ethical concerns about technology adoption from that time? It could be either in your classes or outside of them. (If in a class, tell us a bit about that class.)
Question 9	What other things were you involved in during your time at Wellesley? Organizations, clubs, initiatives?
Question 10	Were there any major political / societal events that were happening during your college years? Do you recall how they affected the campus atmosphere?
Question 11	In what ways did Wellesley (in and outside the classroom) shape the way you want to live (or are living) your life?
Question 12	When making a moral decision, how much (if any) weight do you give to the possible consequences of your decision?
Question 13	When making a moral decision, how much (if any) do you consider what your duty or obligation is to other people?
Question 14	When making a moral decision, how much (if any) do you consider how your actions reflect your character? For example, if you take yourself to be courageous, how important is it for your actions to reflect that property of yourself?
Question 15	When making a moral decision, how much (if any) do you consider the lessons from religious or spiritual texts and/or leaders?
Question 16	Do you have a moral role model? For example, is there someone whose moral character you would like to emulate who serves as a model for how you would like to behave?
Question 17	One of the things that we have been discussing in class is the following set of twelve virtues (parts of the Technology and the Virtues book mentioned above): honesty, humility, self-control, justice, courage, empathy, care, civility, flexibility, perspective, magnanimity, and wisdom. Do any of these virtues resonate with you as things that you have striven to cultivate in yourself over your life?
Question 18	What is your current job? If possible, can you tell us about your responsibilities?
Question 19	Do any of the virtues from Q17 resonate with you as ones that are important to your workplace? [If not currently employed, ask about a prior workplace.]
Question 20	Do any of the virtues from Q17 resonate with you as ones that ought to be present in your workplace? [If not currently employed, ask about a prior workplace.]
Question 21	Do you feel like you have to practice different moral values inside and outside of the workplace?
Question 22	Have you ever switched jobs, because of ethical conflicts?
Question 23	Do you think that equipping students with the powers of ethical reasoning should be a feature of a Wellesley College education?
Question 24	A: If yes to Q23, are there particular questions or case studies that you think should be included? B: If no to Q23, why not? And, where do you think young people should develop these skills if not in college?
Question 25	If college were the appropriate place for this education, where should it happen? The classroom? Extracurricular activities? Somewhere else?
Question 26	What are some of your favorite digital technologies (devices or apps) that you use compulsively?
Question 27	What worries (if any) do you have about the companies that make/operate these products?
Question 28	Have you ever given up using a device or app because of ethical concerns about it?
Question 29	Are you worried about AI (or any of the various AI-related technologies)? If so, in what way?
Question 30	What can citizens do when they are worried about technology?