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Evaluation of Day of AI 2023

AI Literacy Curricula for K-12

Fiona Hollands, Ph.D.

EdResearcher

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Key Takeaways
Evaluation of Day of AI 2023: AI Literacy for K-12

Day of AI is an initiative developed by MIT RAISE in collaboration with i2 Learning to introduce educators and students worldwide to AI literacy, to responsible design and use of AI, and to implications of AI for digital citizenship and society. In 2023, MIT RAISE commissioned an independent evaluation of the Day of AI initiative to assess whether it is meeting its goal of providing a set of easily-accessible AI literacy curricula for K-12 students that can inform and inspire a generation of diverse, ethically-responsible AI users and designers. The study addressed six overarching questions listed below with key findings. Data were gathered primarily using an online survey completed by 265 registrants, and interviews with 17 educators who taught the curricula to their students.

In summary, the evaluation suggests there is substantial demand from educators as well as students for high-quality, interactive, instructional materials about AI and its current and potential applications, and that educators from around the globe have successfully implemented the Day of AI curricula. Educators were almost invariably very complimentary about the quality of the Day of AI materials. Both educators and students gained knowledge about how AI works, key AI concepts, current uses of AI, and potential benefits and harms to society. In addition, learning more about AI increased their levels of optimism about the potential benefits of AI to society and about their own abilities to contribute to shaping the future of AI. The reported impact is impressive given how little time students engage in the Day of AI curriculum content relative to other topics and subjects they study.

Teachers implementing the curricula were generally highly educated, experienced, and very comfortable using computers. Over half of them took time to adapt the Day of AI curricula for their local contexts. As might be expected, they most often taught computer science, technology, or math. These educators often chose to implement the curricula unilaterally and on a voluntary basis.

Going forward, to extend the reach of Day of AI curricula beyond highly-motivated, self-selecting educators and move towards more institutional adoption, MIT RAISE could conduct outreach to education decision-makers such as state education board and local school board members; leaders of school districts, state education agencies, school networks, and schools; and parents to inform them about the critical need for AI literacy. In addition, MIT RAISE could seek to replicate localized Day of AI initiatives following the model of Day of AI Australia. These would involve collaborations with networks of schools, school districts, or professional educator associations, and working with local curriculum designers and educators in each instance to adapt the curricula for the local context. The curriculum adaptations would maximize feasibility of implementation within local constraints, include differentiated training and supports for teachers of varying background knowledge and skills (e.g., for teachers with a computer science background vs. those with no computer science training), and ensure congruence with local standards, integration with existing curricula, and cultural relevance.

1) Who is interested in the Day of AI curricula and why?

- Approximately 7,600 people from 136 countries registered to access 1-12 Day of AI 2023 curricula
- 65% of the registrants identified their roles as teachers
- 63% of the registrants were in the US, with at least one registrant from each of the 50 states and DC
- 1%-5% of the registrants were located in each of: India, Viet Nam, Canada, Spain, China, Mexico, the United Kingdom

- Commonly indicated goals for accessing the Day of AI curricula were: to get ideas and materials for teaching students about AI, to implement the curricula with students, and to learn about AI

2) Who led and participated in the Day of AI activities?

The Teachers:

- 190 of the 265 survey respondents taught one or more of the Day of AI curricula to students. 91% of these "implementers" identified their role as teachers or instructors, 6% were curriculum coaches, and 6% were parents (each person could select multiple roles)
- Implementers were 71% female; 16% Hispanic; 61% white, 15% Asian, 7% Black or African American, and 5% multiracial
- 78% of the implementers held a Master's or higher degree
- On average, implementers had 16 years of teaching experience
- 86% of the implementers were 35 to 64 years old
- The most common subject areas in which implementers held a degree were education, computer science, science, and technology
- The most common subjects taught by implementers were computer science, technology, and math
- Implementers expressed a high level of comfort using computers, averaging 9.26 on a scale of 0-10
- The most commonly taught curriculum was *What Can AI Do?* (for ages 5-7), followed by *ChatGPT in School* (for ages 8-18), and *Teachable Machines* (for ages 8-10)

The Settings and Students:

- 64% of the implementers taught the Day of AI curricula in government-funded schools and 21% taught them in private/independent schools
- 19% of the US government-funded schools were Title I schools, 6% were charter schools, 3% were magnet schools, 3% were special education schools, 2% were career and technical schools
- 73% of the implementers reported being the sole implementer of the Day of AI curricula in their school/setting, 22% reported that up to 5 teachers implemented the curricula, 4% reported that 6-10 teachers implemented them, and 1% reported that more than 10 teachers implemented them
- 95% of implementers taught general education students, 49% taught students with disabilities, and 40% taught students who are not fluent in the primary local language
- Implementers collectively taught the curricula to at least 11,884 individuals aged from under 5 to over 50 years old (including teachers and other staff members)
- Over half the implementations were with students of mixed ages but the majority reached students aged 9–18 years: 41% of the implementations included students of elementary school age (K-5 in the US), 68% included students of middle school age (Grades 6-8 in the US), and 63% included students of high school age (Grades 9-12 in the US).

3) What AI-related concepts are teachers and students learning as a result of engaging with the Day of AI curricula?

- On average, survey respondents reported their level of knowledge about AI as 3.8 on a scale of 0-10 *before* engaging with the Day of AI curricula and 6.0 *after* engaging with the curricula, a statistically significant increase

- Averaging across all curricula taught, students' level of knowledge about AI was reported by implementers as 2.4 on a scale of 0-10 *before* engaging with the Day of AI curricula and 4.3 *after* engaging with the curricula
- Over 70% of implementers indicated that the curricula helped students a lot or to some extent in:
  - understanding how AI is currently being used
  - the mechanics of how AI works
  - the potential for AI to benefit people and society
- 50%-65% of implementers indicated that the curricula helped students a lot or to some extent in:
  - understanding the potential dangers of AI to people and society
  - applying AI concepts to complete a task
  - understanding how and why AI applications may be biased
  - understanding ethical implications of AI
  - understanding how AI applications may use data in ways that raise concerns about privacy
  - understanding how they themselves can contribute to shaping the future of AI
  - understanding why AI applications may raise concerns about equity
  - using AI to solve problems creatively

4) What impact is the Day of AI content having on teacher and student perceptions of AI and their sense of agency in determining its place in their future?

- On average, survey respondents reported their level of optimism about the potential benefits of AI to society as 5.6 on a scale of 0-10 *before* engaging with the Day of AI curricula and 7.1 *after* engaging with the curricula, a statistically significant increase
- Respondents noted that it was helpful to see practical examples of AI being used to facilitate tasks, and that the focus on ethical use of AI helped alleviate concerns about misuse of AI
- 63% of survey respondents felt more able to contribute to shaping the future of AI as they learned more about AI
- 77% of survey respondents felt they could contribute "a lot" or "some" to shaping the future of AI *literacy* (i.e., people's ability to understand the role of AI in our lives, to evaluate its pros and cons, and to use it productively)
- Averaging across all curricula taught, students' level of optimism about the potential benefits of AI to society was reported by implementers as 5.0 on a scale of 0-10 *before* engaging with the Day of AI curricula and 6.7 *after* engaging with the curricula
- 61% of implementers reported that their students felt they can contribute a lot or to some extent to shaping the future of AI. 77% of implementers reported that students' sentiments on this topic improved as they learned more about AI
- All 15 Day of AI curricula scored 6 or higher on a scale of 0-10 for cultural relevance, averaging 7.0
- The curricula averaged 6.1 on a scale of 0-10 for how adequately they address issues related to equity
- The curricula averaged 6.0 on a scale of 0-10 for how adequately they address issues related to social justice

5) How are the Day of AI activities being integrated with existing schedules and activities?

- 80% of implementers delivered the curricula during regular class hours, 6% delivered them before or after school, 4% during lunch, 4% as part of end-of-term activities, 3% as part of summer school, and 3% during free periods for students

- The average amount of time students spent engaging with the Day of AI curricula ranged from 2.3 hours for *Personal Image Classifier* to 8.5 hours for *AI Blueprint Bill of Rights*
- The average number of sessions over which each curriculum was implemented ranged from two sessions to six
- Implementers spent between zero and 20 hours preparing to teach each curriculum. Per curriculum, preparation time averaged from 2 hours up to 6.75 hours.

6) How can the Day of AI activities be improved to actively engage more teachers and students?

- 85% of the implementers indicated that the Day of AI curriculum they taught was appropriately challenging for their students. 8% indicated that it was not challenging enough and 8% indicated that it was too hard for the students to understand
- 55% of the implementers adapted the curriculum to better suit their own context. Common adaptations were omitting, condensing, or modifying activities to fit into the available time or to avoid difficult content
- The majority of suggestions for improvement of the Day of AI curricula related to ways of minimizing didactic approaches to teaching and increasing student engagement with the materials. These included providing more opportunities for interaction with students, offering more advanced content and extensions including independent activities such as projects, and including more games or game-like activities
- Other suggestions for improvements focused on improving accessibility of the materials to more educators and students. These included providing training for teachers on how to implement the curricula and translating the curricula into other languages
- Suggestions for maintaining or improving the quality of the Day of AI content and resources included better organization of content on the website, keeping the content up to date each year, providing a sequenced progression of curricula, and providing differentiated activities to serve variable student needs and interests
- Implementers listed a number of ways to make the curricula more culturally relevant including the addition of non-US centric examples and providing content to introduce AI and its potential benefits to parents who may act as gatekeepers preventing their children from using and learning about it
- Implementers provided suggestions as to how the Day of AI curricula could better address issues related to equity which included being mindful that some AI-based technology is not affordable to low-income students, and increasing the focus on AI and people with disabilities
- Implementers provided suggestions as to how the Day of AI curricula could better address issues related to social justice including more attention to ways in which people of color have been harmed by AI and addressing how AI can be used to identify and combat discrimination

Recommendations

To further increase the reach and impact of the Day of AI initiative, MIT RAISE should:

I. Increase outreach to education decision-makers who can institutionalize AI literacy instruction
II. Replicate Day of AI initiatives in multiple locales
III. Provide a concise overview for instructors on the content, audience, and sequencing for Day of AI curricula
IV. Plan for ongoing curriculum updates, revisions, and adaptations
V. Increase participation in Day of AI by more closely aligning with schools' existing priorities

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Evaluation of Day of AI 2023: AI Literacy for K-12

The Rise of AI Literacy

As applications of AI have proliferated, the call has grown for educating students about what AI is, how it works, and how it can affect us (Miao et al., 2021; Miao & Shiohira, 2022; U.S. Department of Education, Office of Educational Technology, 2023). Touretzky et al. (2019a) stress the importance of engaging students as early as Kindergarten to ensure an informed populace and a diverse set of AI developers. Touretzky et al. (2019b) laid out 5 big ideas every K-12 student should know about AI and on which K-12 AI literacy curricula should be based:

- Computers perceive the world using sensors
- Agents (AI systems) maintain models/representations of the world and use them for reasoning
- Computers can learn from data
- Making agents interact comfortably with humans is a substantial challenge for AI developers
- AI applications can impact society in both positive and negative ways

The AI4K12 initiative, jointly sponsored by the Association for the Advancement of Artificial Intelligence and the Computer Science Teachers Association, has since developed national guidelines for K-12 AI education based on these ideas. Initial efforts to implement and evaluate AI literacy curricula suggest they can help students become more knowledgeable users and creators of AI (DiPaola et al., 2020; Lee et al., 2021). Williams et al. (2022) recommend that curricula on AI concepts should incorporate active learning and "unplugged" activities, engage students in projects, and help students consider ethical implications of AI applications. They also highlight the need to "mind the digital gap" and lower barriers to entry by limiting the amount of prerequisite knowledge and technology resources students need to engage in the curricula.

Introduction to the Day of AI Initiative

In 2022, MIT RAISE (Responsible AI for Social Empowerment and Education), in collaboration with i2 Learning, developed four modular, short-format curricula for educators of students aged 8-18 years to use for developing AI literacy among students. The curricula introduce both educators and their students to AI vocabulary and concepts, help them understand the distinguishing characteristics of AI, and demonstrate how AI works and is applied to everyday technologies. They explore benefits to individuals and society and potential harms, emphasizing the need for responsible, equitable, and ethical design and use of AI. The materials are freely available online at https://www.dayofai.org/ and can be downloaded and used by any individual who registers to access them. While they can be used with students at any time, a specific date in May 2022 was nominated "Day of AI" on which several events were organized both in person and online to create a sense of community and promote the cause of AI literacy. According to MIT RAISE's Day of AI 2022 Impact Report, the curricula available in 2022 were accessed by over 3,000 teachers across 93 countries.

In 2023, MIT RAISE expanded the number of Day of AI curricula to 12 including a new curriculum on ChatGPT given the explosion of interest in the technology and alarm over its possible misuses. A curriculum was also added for students aged 5-7 years. The curricular materials, including educator guides, teacher slides, student resources, and training videos, can be adapted and redistributed under a Creative Commons license. Three derivative curricula were created for a Day of AI Australia initiative. Details of the 15 curricula are shown in Table 1. The curricula were designed to be taught by educators with minimal experience teaching AI and with limited equipment beyond digital devices and internet access.

Table 1. Day of AI Curriculum Information

Curriculum	Target age group	Target grade level	Estimated no. of hrs to implement	No. of lessons	Topics addressed	No. of survey respondents teaching this curriculum
What Can AI Do?	5-7yrs	K-2	4.0	4	Define AI; identify AI applications, capabilities and limitations; AI sensors; image recognition and sorting	101
Teachable Machines	8-10yrs	G3-5	3.0	5	Machine learning: collecting datasets, training an algorithm, predicting on new data, algorithmic bias	54
AI Blueprint Bill of Rights	8-10yrs	G3-5	4.8	7	How human rights are impacted by the use of AI: non-discrimination, privacy, transparency, safety	6
Can Machines Be Creative?	11-13yrs	G6-8	3.5	5	Machine learning: collecting datasets, training an algorithm, predicting on new data; algorithms; Generative Adversarial Networks (GANs); deepfakes and data manipulation; ethical and responsible use of AI	33
Game AI	11-13yrs	G6-8	3.2	4	Introduction to Scratch, rule-based learning vs. reinforcement learning and ethical implications	23
AI in Social Media	11-18yrs	G6-12	4.0	8	AI in recommendation systems, clustering algorithms and filter bubbles; how misinformation can spread; responsible use and regulation of social platforms	25
Data Science and Me (no coding version)	14-18yrs	G9-12	4.3	6	Creating datasets, sharing data, data activism, bias in data, data visualizations, how identity and power can be expressed through data	8
Data Science and Me (coding version)	14-18yrs	G9-12	5.8	8	Creating datasets, aggregating and cleaning data, combining data sources using Python, data visualizations, how data is captured about individuals by governmental and social technology systems, sharing data, how identity and power can be expressed through data	7

Table 1. Cont.

Curriculum	Target age group	Target grade level	Estimated no. of hrs to implement	No. of lessons	Topics addressed	No. of survey respondents teaching this
Intro to Voice AI	14-18yrs	G9-12	1.0	1	How voice AI works, program Alexa skills using voice AI, how Alexa uses AI to determine what user commands mean	35
Personal Image Classifier	14-18yrs	G9-12	3.6	6	Image classification, using App Inventor to create a Personal Image Classification model, bias in machine learning systems, ethical implications of using AI in image recognition	16
Data Science and Decision Making	14-18yrs	G9-12	6.3	9	AI in college admissions decisions, biased AI and Algorithmic Decision Making, analyzing and visualizing data, implications of using and not using affirmative action policies	8
ChatGPT in School	8-18yrs	G3-12	3.5	4	AI and the creative process, how large language models work, chatbots vs. search engines, benefits and limitations of large language models, how they should be used in schools	59
Curricula offered in Australia only						
Primary School Years 5 & 6	10-11yrs	G5-6	3.75	5	What AI is, how it works, AI applications, datasets, algorithms, bias and how machines learn, training a machine learning system to recognize objects, GANs, deepfakes, developing an AI product pitch	1
Secondary School Years 7 & 8	12-13yrs	G7-8	5.2	5	What AI is, how it works, AI applications, machine learning, datasets, explore common AI tools, explore societal impact of AI and apply a system of ethics to AI development, generative AI models and their implications, develop an AI product pitch	2
Secondary School Years 9 & 10	14-15yrs	G9-10	5.2	5	Same as Secondary School Years 7 & 8 plus effects of data bias in AI	4

Research Questions Addressed by the Evaluation

MIT RAISE commissioned an evaluation of the Day of AI 2023 curricula by an external evaluator to address the research questions listed in Box 1.

Box 1. Research Questions Addressed by Day of AI Evaluation

1) Who is interested in the Day of AI curricula and why?
2) Who led and participated in the Day of AI activities?
3) What AI-related concepts are teachers and students learning as a result of engaging with the Day of AI curricula?
4) What impact is the Day of AI content having on teacher and student perceptions of AI and their sense of agency in determining its place in their future?
5) How are the Day of AI activities being integrated with existing schedules and activities?
6) How can the Day of AI activities be improved to actively engage more teachers and students?

This report presents the results of the evaluation of MIT RAISE's Day of AI 2023 initiative.

Methods

To address the research questions, we gathered data from individuals who had registered to access the Day of AI materials. A few data points were available on up to 7,636 registrants from the online registration form but the majority of the evaluation data was collected using a voluntary online survey and virtual interviews. The study was deemed exempt from human subjects research review by MIT's Committee on the Use of Humans as Experimental Subjects. The survey questionnaire and interview protocol were iteratively co-designed by the external evaluator, EdResearcher, the curriculum developers at MIT, the program lead at MIT RAISE, and an external design and implementation partner, i2 Learning. While the survey was new, a number of the questions were adapted from shorter surveys used the previous year by the curriculum developers for internal evaluation or from online surveys used previously by the external evaluator to collect data from approximately 30,000 learners on non-traditional learning experiences offered by universities. We describe each instrument in more detail below including contents, recruitment strategies, and deployment.

Surveys

The survey was built in Qualtrics and included multiple choice, dropdown, sliding scale, and open-ended questions. The survey was designed to allow for multiple pathways through the questions with all respondents being asked an initial set of questions to understand their interest in the curricula, how the curricula affected their views of AI and knowledge level about AI, and demographic information. Only respondents who implemented one or more of the Day of AI curricula with students ("implementers") were asked a more extensive set of questions to elicit information about the types of students to whom they taught the curricula and the impact of the curricula on their students, and to ask for curriculum-specific feedback. Implementers were also asked whether they would be open to being invited to participate in a follow-up interview and, if so, to provide an email address. A few variations were built in to the survey depending on the country in which the respondent was located (e.g., implementers in US public schools were asked about the type of school and whether it was a Title I school). The survey was

piloted with three educators. Feedback provided by the pilot respondents was used to make minor adjustments to question wording and response options.

Recruitment and response rate: Invitations to complete the online survey were sent by email four times between May 23rd 2023 and June 27th 2023 to 7,204 unique individuals who registered to access the Day of AI curricula online and provided an email address. By late July 2023, we had received a total of 373 responses, representing a response rate of 5%. However, 97 respondents provided no data beyond naming country of location, one respondent provided only two additional data points, seven respondents did not agree to complete the survey, two were excluded from the study due to being located in a sanctioned country, and one was a duplicate. The remaining 265 responses that included answers to at least one question about the Day of AI materials were included in the analytic sample.

Interviews

Content of the interview questions: The structured interview protocol (Merriam & Tidsell, 2015) was designed to provide in depth information on:

- how the Day of AI curricula were implemented
- why the interviewees decided to teach the curricula
- their goals and how well these were met
- what aspects of the curricula were most and least valuable
- obstacles encountered in teaching the curricula and adaptations needed for local context
- whether additional supports such as training would be helpful
- whether and how the interviewee intended to continue teaching their students about AI
- suggestions for additional issues or AI concepts that Day of AI curricula could address

In addition, interviewees were asked about what they are most optimistic with respect to AI, what worries them the most about AI, whether and how AI might be particularly helpful in education, whether they felt that their students have a good understanding of the potential benefits and risks of AI, what misconceptions students have about AI and how they think these can be corrected, and whether their students feel they can contribute to shaping the future of AI.

By mid-June 2023, a total of 40 survey respondents had volunteered to be interviewed. The external evaluator assigned each respondent a random number from 1-40 and worked with an MIT doctoral student, Daniella DiPaola, to email potential interviewees sequentially between June 19th and June 28th.[1] Ms. DiPaola started with the respondent assigned the number 1 and worked down the list while the external evaluator started with the respondent assigned the number 40 and worked backwards up the list, excluding one who was in a sanctioned country. We initially set a target of 15 interviews and were able to meet this after sending 35 invitations. We interviewed respondents who agreed to be interviewed before the end of July 2023.

The external evaluator conducted 11 interviews and Ms. DiPaola conducted 6 interviews. Interviews lasted 34-65 minutes and, in most cases, the interviewee gave permission for the interview to be recorded and transcribed. Ten of the interviewees were located in the US, distributed across eight states. Seven interviewees were from abroad: Spain (two interviewees), Algeria, Scotland, Guatemala, Singapore, and Australia. The external evaluator conducted a content analysis of the interview notes, identifying key themes that emerged (White & Marsh, 2006).

[1] Note that Ms. DiPaola participated in the development of one of the curricula (AI Blueprint Bill of Rights) but none of the interviews she conducted were with individuals who implemented this curriculum.

Findings

Findings from the surveys and interviews are reported as they relate to each of the 6 research questions.

1. Who is interested in Day of AI programming and why?

Approximately 7,600 unique individuals registered to access Day of AI curricula from the main, US-based Day of AI website[2], 65% of whom identified their roles as teachers. Other roles are listed in Table 2 below. In Australia, an additional 658 teachers serving 104,000 students in 564 schools registered via the Day of AI Australia website to access the three curricula adapted for Australia. Data on registrants reported in the tables below are only from registrants on the main Day of AI website.

Table 2. Roles of Registrants Accessing Day of AI Curricula via Main Day of AI Website

Registrant roles	Frequency	Percentage
Teacher	4,955	65%
Parent	639	8%
Student	535	7%
School	530	7%
Other	409	5%
Researcher	278	4%
Non-Profit	199	3%
Corporation	91	1%
Total	7,636	100%

Registrants reported being located in 136 countries with almost two thirds based in the United States. Table 3 below shows the countries in which 1% or more of the registrants were located. A full list of countries is provided in Appendix A. However, see the endnote regarding the accuracy of location data.

Table 3. Countries in Which 1% or More of the Day of AI Registrants Were Located

Country of location	Number of registrants	% of registrants
United States of America	4,932	64.6%
India	384	5.0%
Viet Nam	327	4.3%
Canada	248	3.3%
Spain	107	1.4%
China	106	1.4%
Mexico	95	1.2%
United Kingdom	76	1.0%

[2] The exact number of unique registrants is difficult to ascertain as some individuals registered more than once. From an initial list of 8,683 people who registered to access the Day of AI curricula between 2/1/2023 and 8/13/2023, at least 1,047 were identified as likely duplicates based first on a comparison of email addresses, and subsequently by comparing name, school/organization, city, state, country, role, and grade levels taught. An additional 73 names appeared between 2 and 6 times but it was not clear that they were duplicates so, for data analysis, they were kept in the final count of 7,636 registrants.

At least one person registered from every state in the US. Table 4 below lists the top 10 states in which Day of AI registrants were located. A full list of the number of registrants in each US state is available in Appendix A, Table A2.

Table 4. Top 10 States in Which Day of AI 2023 Registrants Were Located

State	Number of registrants in this state	% of US-based registrants located in this state
Texas	540	11.0%
New York	500	10.1%
California	480	9.7%
Massachusetts	359	7.3%
Pennsylvania	226	4.6%
Illinois	184	3.7%
New Jersey	160	3.2%
Michigan	154	3.1%
Florida	151	3.1%
Virginia	144	2.9%

The remainder of this report focuses on data collected from the 265 respondents to the online survey, the subset of 190 of these respondents who taught one or more of the curricula to students, and from 17 interviewees.

Demographics of Survey Respondents

Survey respondents were located in 38 countries with 68% based in the US. At least one respondent was located in each of 33 US states. Respondent demographics are shown in Table 5: 70% identified as female; 26% as male; 15% as Hispanic[3]; 56% as White, 16% as Asian, 6% as Black or African American, and 5% as multiracial. Over three quarters of the survey respondents held a graduate degree. Only 12% reported their age as under 35. While it is unclear why few younger teachers taught the curricula and responded to the survey, one interviewee noted that, as an experienced teacher, she was "*not afraid to jump into something I don't totally understand.*" She expected that less experienced teachers might need more help as they may be afraid to teach something unfamiliar in front of their students.

Roles of Survey Respondents

The vast majority of survey respondents and 91% of those who implemented one or more of the curricula with students identified as teachers or instructors. Other commonly indicated roles are shown in Table 6.

Subjects in Which Respondents and Implementers Held a Degree

Survey respondents and implementers held degrees in a range of disciplines as shown in Table 7. The most common subject areas in which they held degrees were education, computer science, science, and technology.

[3] Following the currently-prevailing US Census categorizations, Hispanic/Not Hispanic is considered ethnicity, not race.

Table 5. Demographics of All Survey Respondents and of Implementers

Characteristic		All survey respondents (n = 239 to 265)	Implementers (n=190)
Gender	Female	70%	71%
	Male	26%	27%
	Non-binary/third gender/prefer not to answer	3%	3%
Ethnicity	Hispanic	15%	16%
Race with which respondent identified	White	56%	61%
	Asian	16%	15%
	Black or African American	6%	7%
	Multiracial	5%	5%
	None/other/prefer not to answer	14%	17%
Highest degree earned	Bachelors	21%	19%
	Masters	57%	63%
	Doctorate, Ed.D., Ph.D., Professional	18%	15%
Age	Up to 24yrs	4%	3%
	25-34 yrs	8%	8%
	35-44 yrs	25%	26%
	45-54 yrs	35%	36%
	55-64 yrs	22%	24%
	65+ yrs/prefer not to answer	5%	2%

Note. For comparison, US K-12 teachers are: 76.6% female; 9.3% Hispanic; 80.3% White, 2.4% Asian, 5.8% Black or African American, 1.7% multiracial. Highest degree earned by US teachers is 38.9% BA, 50.1% MA, 9.7% higher than MA. Median age of US teachers is 42.3 years with 14.1% less than 30, 54.6% 30-49 years, 13% 50-54 years, and 18.2% more than 55. See https://nces.ed.gov/pubs2022/2022113.pdf

Table 6. Roles of Survey Respondents and Implementers

	All respondents (n = 265)	Implementers (n = 190)
Teacher/instructor	221	172
Curriculum coach	27	12
Researcher	19	9
Student	16	6
Parent	15	11
Tutor	13	4
School/District administrator	11	7
Non-profit officer/representative	10	3
Corporate officer/representative	7	3
Other	18	8

Note. Respondents could select multiple roles.

Table 7. Subjects in Which Respondents Held A Degree

Subject of Degree	All respondents (n = 265)	Implementers (n = 190)
Education	23%	25%
Computer Science	19%	22%
Science (incl. Biology, Chemistry, Physics, Psychology, Medicine)	15%	17%
Technology	15%	17%
Mathematics	13%	14%
Literature/Languages	11%	11%
Engineering	9%	11%
Social Studies (incl. History, Geography, Economics, Civics, Government, Sociology, Political Science)	7%	7%
Business, Marketing, Management, Finance	5%	5%
Art/Drama/Music/Dance/Culture	5%	5%
Library Science/Information Science/Library Media	3%	4%
Other	7%	7%

Note. Respondents could select multiple subjects.

How Survey Respondents Heard About Day of AI

Table 8 shows sources from which 5% or more of survey respondents heard about Day of AI. In addition to this list, sources mentioned by less than 5% of respondents (1-11 individuals), in descending order were: Instagram, LinkedIn, a news article, i2 Learning, Donors Choose, a corporate sponsor, Amazon Future Engineer, Computer Science Teachers Association (CSTA), code.org, Teach for Australia, Project STEM, App Inventor website, the Association of Technology Leaders in Independent Schools (ATLIS), a family member, a friend, a New View EDU podcast, a past participant, a seminar, a student's parent, a teacher, and WhatsApp.

Table 8. How Survey Respondents Heard About Day of AI (Sources Named by 5% or More of Respondents)

Source of Information	Number of Respondents	% of Respondents (n=265)
MIT RAISE	91	34%
Email	78	29%
MIT	75	28%
ISTE	30	11%
Colleague	26	10%
CS in Schools	22	8%
Google search	20	8%
Facebook	16	6%
Twitter	13	5%

Note. Respondents could select multiple sources of information.

Curricula Reviewed by Survey Respondents

Survey respondents each accessed and reviewed up to 12 of the Day of AI curricula, with the mean number being 2.7 curricula and the median being 2 curricula. Eighty-two percent of the respondents reviewed 1-4 curricula. As shown in Table 9, the most commonly reviewed curriculum was *ChatGPT in School* which

was newly developed this year. Half of the 265 survey respondents had accessed the *ChatGPT in School* curriculum and almost as many had accessed the *What Can AI Do?* curriculum.

Table 9. Number of Survey Respondents Reviewing Each of the Day of AI Curricula

Day of AI curricula reviewed by survey respondents	Number of respondents reviewing this curriculum (n=265)
ChatGPT in School	133
What Can AI Do?	130
Teachable Machines	80
AI in Social Media	70
Can Machines Be Creative?	58
Intro to Voice AI (with Amazon Future Engineer)	54
Game AI	47
Personal Image Classifier	32
Data Science and Decision Making	29
AI Blueprint Bill of Rights	27
Data Science and Me (no coding version)	27
Data Science and Me (coding version)	24
Curricula offered in Australia only	
Secondary School Years 7 & 8	4
Secondary School Years 9 & 10	4
Primary School Years 5 & 6	1

Note. Respondents could select up to 15 curricula.

Goals for Accessing the Day of AI Curricula

As shown in Table 10, the most commonly indicated goal for accessing the Day of AI curricula was to get ideas and materials for teaching students about AI. Additional goals included in the "Other" category included to review the materials to share them with other educators or colleagues, and to identify engaging activities for students. Box 2 provides more detailed insights into the goals of several of the interviewees who implemented Day of AI curricula.

Reasons for Not Teaching Day of AI Curricula to Students

Fifty-four survey respondents provided reasons for not teaching any of the Day of AI curricula to students. The most common reason, as shown in Table 11, is that these respondents were not currently teaching students. Additional reasons included in the "Other" category included learning about the program too late in the school year, lack of materials for graduate students, and the topic not fitting within the existing curriculum. One interviewee at a Title I school in a large school district in the US noted that she did not implement any curriculum where the students would have to log into an online tool, for example, *Game AI* or *Intro to Voice AI*, because she would first have to clear the apps with the school district's IT department. Obtaining these approvals is not only time-consuming but requires substantial lead time prior to implementing the curriculum.

Table 10. Goals for Accessing the Day of AI Curricula

Goals for accessing the curricula	No. of respondents selecting this goal (n=265)
To get ideas and materials for teaching students about AI	186
To implement the curricula with students	152
To learn about AI for myself	150
To learn how AI literacy can be promoted in schools	122
To respond to students' interest in AI	118
To satisfy a request from education administrators/central office that students should be taught about AI	24
To satisfy a request from parents that students should be taught about AI	12
Other	25

Note. Respondents could select multiple goals.

Box 2. A Selection of Interviewee Goals for Implementing Day of AI Curricula

One interviewee, a school principal in Algeria who taught three of the Day of AI curricula to students aged 15-18, described her primary goals as teaching students to be careful about their own AI-based productions and publications, and placing limits and rules on how AI should be used. She noted that boys attending her school had been making deepfakes of "*dead people*" and that one of the female students writes stories and now uses ChatGPT to help her.

Another interviewee, an upper school STEAM teacher and makerspace coordinator in Ohio, described her motivation to hold an assembly (which students rated as the "best ever" assembly) on how large language models (LLMs) work using content from the *ChatGPT in School* curriculum: students had been "*spooked*" by the recently-released My AI feature in Snapchat[4] and approached her to express their anger that they could not eliminate the feature. One of them had snapped a picture in a classroom and My AI asked what was on the wall in the classroom and also commented that it looked like the student was with their friends. Students found this intrusive and wanted to understand how the feature worked. This educator also wanted students to know that ChatGPT and LLMs in general are not "the law," i.e., not necessarily factual.

A third interviewee, an afterschool activity provider in Singapore, noted that the students she was teaching were using BriBooks and wanted to understand how the AI component works. In addition, the students wanted help with work at home and were using ChatGPT so she aimed to teach what AI can do for them in a positive way and how to delegate their work to AI to reduce stress and time burden.

A fourth interviewee, a computer science and engineering educator in a remote urban area of California, was concerned about equity and wanted to ensure that education about AI is not limited to affluent students or to those with coding background.

[4] See https://9to5mac.com/2023/04/24/snapchat-my-ai-pinned-to-feed-update/

Table 11. Reasons Indicated for Not Teaching Day of AI Curricula to Students

Reason for not teaching Day of AI curricula to students	# of respondents giving this reason (n=54)
I am not currently teaching students	20
I was not able to find time in the schedule	13
I felt that I did not have enough background knowledge	7
I found the materials too difficult to use with my students	5
School policies only permit me to use curricula that have been pre-approved by the district/school	5
I did not feel there was enough training or support to help me implement the curricula	4
I used the Day of AI resources to create my own lessons	2
Other reasons	12

Note. Respondents could select multiple reasons.

2. Who led and participated in the Day of AI activities?

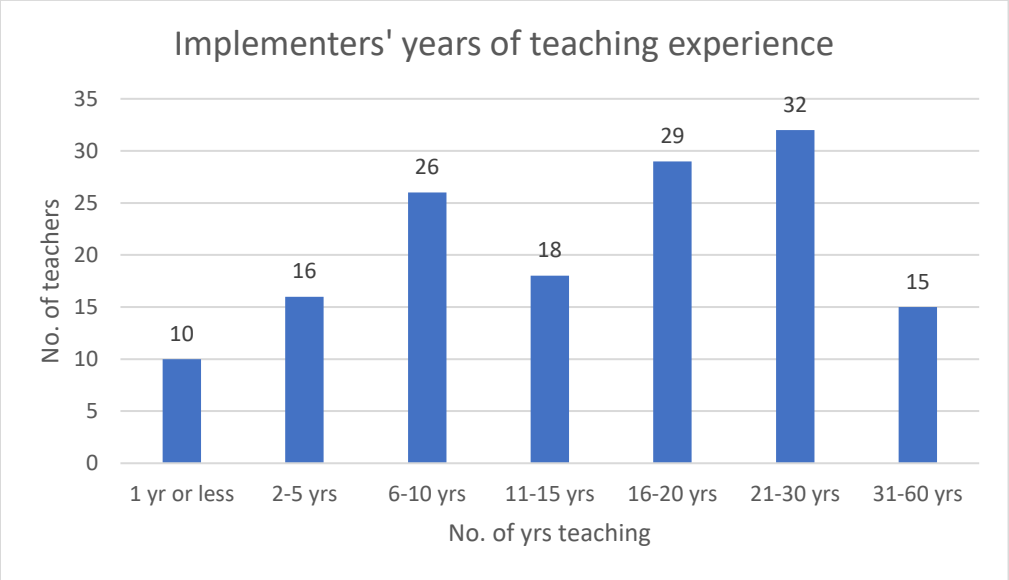
Seventy-two percent (190) of the survey respondents implemented at least one of the Day of AI curricula with students. The last column in Table 1 shows the number of implementers who reported teaching each Day of AI curriculum. *What Can AI Do?* was the most commonly taught curriculum (101 implementers), followed by *ChatGPT in School* (59 implementers) and *Teachable Machines (*54 implementers).

Implementer Demographics, Roles, and Academic Backgrounds

Implementers were located in 32 countries with 69% in the US. Demographics are shown in Table 5: 71% identified as female; 78% held a Master's or higher-level degree; 16% identified as Hispanic; 61% identified as White, 15% as Asian, 7% as Black or African American; and 5% as multiracial. 86% were 35-64 years old.

Ninety-one percent of the implementers were teachers/instructors, 6% were curriculum coaches, and 6% were parents. Other roles are shown in Table 6. Implementers' highest degrees were in a wide range of disciplines as listed in Table 7. The most frequently appearing disciplines were education, computer science, science, and technology. Implementers reported a wide range of years of teaching experience: as little as none and as many as 60 years (see Figure 1). On average, implementers had 16 years of teaching experience (the average years of teaching experience across all teachers in the US is 14.5 yrs, see https://nces.ed.gov/pubs2022/2022113.pdf).

Figure 1. Implementers' Years of Teaching Experience



Implementers taught a wide range of subjects including social studies, literature, languages, the arts, and special education, but, as shown in Table 12 below, the most common were computer science, technology, and mathematics.

Table 12. Subjects Taught by Day of AI Implementers

Subject Taught	% of implementers teaching this subject
Computer Science	58%
Technology	52%
Mathematics	30%
Science (incl. Biology, Chemistry, Physics)	24%
Engineering (incl. Robotics)	24%
English/Language Arts	17%
Social Studies (incl. History, Geography, Economics, Civics, Government)	11%
Arts (incl. Art, Drama, Music, Dance, Filmmaking, Design)	8%
Literature (in local language, i.e., English Literature in US, UK, Australia)	7%
Special Education	5%
Media/Information Literacy/Library	4%
Foreign Languages	3%
Business	2%
All (Elementary/Primary school)	1%
Physical Education	1%
Other	2%

Note. Implementers could select multiple subjects.

Implementer Comfort Level Using Computers

Implementers were asked to indicate their level of comfort using computers on a scale of 0 (not at all) to 10 (very). All respondents selected 5 or above on the scale, with 56% (n=151) selecting 10. The mean score was 9.26.

Settings in Which Day of AI Curricula Were Taught

Implementers were invited to provide additional details about where and how they implemented the Day of AI curricula. Table 13 shows the settings in which the curricula were taught. In almost two thirds of the cases, the curricula were taught in government-funded schools. For respondents in the US, Column 4 in Table 13 shows the specific type of government-funded school. Twenty-two of the schools in which Day of AI curricula were taught were Title I schools.

Seventy-three percent of the implementers (n=171) reported being the sole implementer of the Day of AI curricula in their setting, 22% reported that up to 5 teachers implemented the curricula, 4% reported that 6-10 teachers implemented them, and 1% reported that more than 10 teachers implemented them.

Students to Whom Day of AI Curricula Were Taught

Ninety-five percent (n=151) of implementers taught general education students, 49% taught students with disabilities, and 40% taught students who are not fluent in the primary local language.

Implementers collectively taught the curricula to at least 11,884 individuals aged from under 5 to over 50 years old (including teachers and other staff members). Over half the implementations were with students of mixed ages but, as shown in Table 14 below, the majority reached students aged 9-18 years: 41% of the implementations included students of elementary school age (K-5 in the US), 68% included students of middle school age (Grades 6-8 in the US), and 63% included students of high school age (Grades 9-12 in the US). Table 15 below lists each Day of AI curriculum, the target age range and grade levels, and the reported ages of students to whom implementers delivered the curricula. In addition to students within the target range, five curricula were taught to younger students and eight curricula to older students.

Table 13. Settings in Which Day of AI Curricula Were Taught

Setting	% of implementations in this setting (n=184)	For US respondents, type of govt.-funded school	% of US govt.-funded schools of this type (n=118)
Government-funded school	64%		
		District school*	61%
		Title 1 school	19%
		Charter school	6%
		Magnet school	3%
		Special education school	3%
		Career & Technical/ Technology school/center	2%
Private/independent school	21%		
Parochial school	7%		
Afterschool activity provider outside of school	6%		
Home school	4%		
Institution of higher education	4%		
Private tutor outside of school	2%		

*US government-funded schools that are not charter schools are commonly termed "district schools" but may have additional descriptors such as Title I (59.8% of govt.-funded schools), magnet (3% of govt.-funded schools), special education (1.9% of govt.-funded schools), career and technical (1.6% of govt.-funded schools) etc. 7.8% of govt.-funded schools are charter schools. See https://nces.ed.gov/ccd/tables/202021_summary_3.asp#f2

Note. Percentages do not add up to 100% because each implementer may have taught more than one curriculum and may have implemented each curriculum in more than one setting. In addition, US-based implementers did not all specify the type of govt.-funded school in which they taught. Other settings not listed in the table but mentioned by a single respondent included a library, a teacher training session via Zoom, and localized camps/workshops for children in unoccupied territories of Ukraine created by a non-profit organization with the support of UNICEF.

Table 14. Ages of Students Reached by Day of AI Curricula Implementations

Age of Students	% of implementations reaching this age group
Under 5 yrs old	1%
5-6 yrs old	7%
7-8 yrs old	10%
9-10 yrs old	24%
11-12 yrs old	34%
13-14 yrs old	34%
15-16 yrs old	39%
17-18 yrs old	24%
19-21 yrs old	4%
22-30 yrs old	2%
31-50 yrs old	1%
Over 50 yrs old	1%

Note. Many implementations reached students in multiple age bands hence the total percentage exceeds 100%. Older "students" were often teachers/educators in college courses or professional development sessions.

Table 15. Comparison of Target Age Group for Each Day of AI Curriculum and Age Range of Students to Whom the Curricula Were Taught

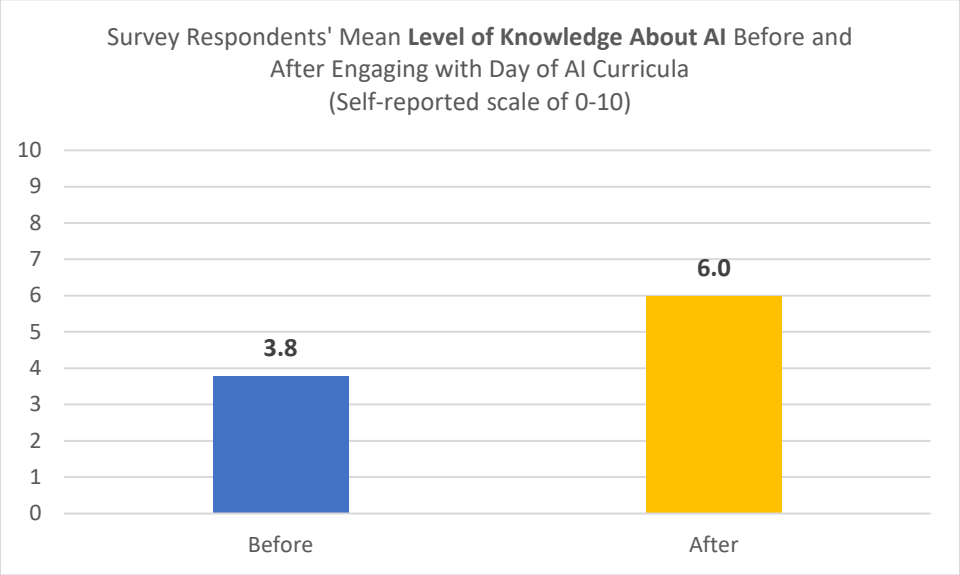
Curriculum	Target age group	Target grade level	Age range of students to whom curriculum was taught	
			Youngest (Yrs)	Oldest (Yrs)
What Can AI Do?	5-7yrs	K-2	Under 5	22-30
Teachable Machines	8-10yrs	G3-5	5-6	Over 50
AI Blueprint Bill of Rights	8-10yrs	G3-5	9-10	17-18
Can Machines Be Creative?	11-13yrs	G6-8	5-6	17-18
Game AI	11-13yrs	G6-8	9-10	17-18
AI in Social Media	11-18yrs	G6-12	13-14	19-21
Data Science and Me (no coding version)	14-18yrs	G9-12	15-16	17-18
Data Science and Me (coding version)	14-18yrs	G9-12	15-16	15-16
Intro to Voice AI	14-18yrs	G9-12	Under 5	19-21
Personal Image Classifier	14-18yrs	G9-12	15-16	17-18
Data Science and Decision Making	14-18yrs	G9-12	No response	No response
ChatGPT in School	8-18yrs	G3-12	9-10	Over 50
Curricula offered in Australia only				
Primary School Years 5 & 6	10-11yrs	G5-6	No response	No response
Secondary School Years 7 & 8	12-13yrs	G7-8	11-12	13-14
Secondary School Years 9 & 10	14-15yrs	G9-10	13-14	15-16

3. What AI-related concepts are teachers and students learning as a result of engaging with the Day of AI curricula?

Survey Respondents' Level of Knowledge About AI Before and After Engaging with Day of AI Curricula

All survey respondents were asked to indicate on a scale of 0-10 their level of knowledge about AI before and after engaging with the Day of AI curricula (where 0 indicates no knowledge and 10 indicates expert knowledge). A paired samples t-test found a significant increase in self-reported level of knowledge from before (M=3.8, SD=2.03) to after engaging with the Day of AI curricula (M=6.0, SD=2.22); $t(257)=20.936$, $p<.001$. See Figure 2 for a graphical depiction of this increase.

Figure 2. Increase in Survey Respondents' Level of Knowledge About AI Before and After Engaging with Day of AI Curricula



Note: Results are based on 258 survey respondents who provided a level-of-knowledge score for both before and after engaging with the Day of AI curricula.

Students' Level of Knowledge About AI Before and After Engaging with Day of AI Curricula

Implementers were similarly asked to rate their students' level of knowledge about AI before and after implementing the Day of AI curricula. Results are shown by curriculum in Table 16. Results in this and other tables based on only one or a few responses should be viewed with caution. The weighted average score across curricula increased from 2.4 to 4.3. Implementers were also asked to rate the extent to which the curricula improved specific aspects of their students' AI literacy. Results are shown in Table 17. Over 70% of implementers indicated that the curricula helped students a lot or to some extent in understanding how AI is currently being used, the mechanics of how AI works, and the potential for AI to benefit people and society. Between 50% and 65% of implementers indicated that the curricula helped students a lot or to some extent in understanding the potential dangers of AI to people and society, applying AI concepts to complete a task, understanding how and why AI applications may be biased, understanding ethical implications of AI, understanding how AI applications may use data in ways that raise concerns about privacy, understanding how they themselves can contribute to shaping the future of AI, understanding why AI applications may raise concerns about equity, and using AI to solve problems creatively.

Table 16. Reported Impact of Curricula on Student's Level of Knowledge About AI and on Students' Optimism About AI

Curriculum	No. of implementers providing feedback on this curriculum	Total # of students to whom implementers taught this curriculum	Avg # of hrs students spent on curriculum	Teacher's rating of students' level of knowledge about AI (0-10 scale) before/after engaging with the curriculum			Teacher's rating of students' level of optimism about AI (0-10 scale) before/after engaging with the curriculum		
				Before	After	Change	Before	After	Change
What Can AI Do?	55	5,140	4.2	2.1	4.0	+1.9	4.6	6.6	+2.0
ChatGPT in School	32	1,566	5.0	2.8	4.6	+1.8	5.0	6.8	+1.8
Intro to Voice AI	26	1,296	3.8	2.7	4.7	+2.0	5.8	6.8	+1.0
Teachable Machines	21	1,840	2.8	2.6	4.8	+2.2	5.6	7.0	+1.4
Can Machines Be Creative?	15	890	4.9	1.4	3.5	+2.1	4.3	6.6	+2.3
AI in Social Media	10	343	3.4	3.4	4.2	+0.8	4.6	6.3	+1.7
Game AI	9	390	3.5	1.3	2.6	+1.3	5.1	6.6	+1.5
AI Blueprint Bill of Rights	4	170	8.5	4.3	5.8	+1.5	5.0	6.8	+1.8
Data Science and Me (no coding version)	3	15	8.3	3.0	2.0	-1.0	6.0	10.0	+4.0
Personal Image Classifier	3	148	2.3	2.3	4.7	+2.4	5.3	7.0	+1.7
Data Science and Decision Making	1	-	-	-	-	-	-	-	-
Data Science and Me (coding version)	1	4	7.0	6.0	7.0	+1.0	5.0	6.0	+1.0
Curricula offered in Australia only									
Secondary School Years 9 & 10	3	76	6.0	2.0	6.0	+4.0	4.7	7.7	+3.0
Secondary School Years 7 & 8	1	6	5.0	1.0	7.0	+6.0	3.0	9.0	+6.0
Primary School Years 5 & 6	0	-	-	-	-	-	-	-	-
Total/Weighted Average	184	11,884	4.3	2.4	4.3	+1.9	5.0	6.7	+1.8

Note. In this table, curricula have been ordered based on the number of implementers providing feedback. Results for those curricula receiving the most feedback should be considered the more reliable results.

Table 17. Implementers' Rating of the Extent to Which the Curricula Improved Specific Aspects of Students' AI Literacy

Aspect of AI Literacy	n	Extent to which the curricula improved this aspect of AI literacy				
		A lot	Some	A little	Not at all	N/A
Understand how AI is currently being used	129	29%	50%	19%	2%	1%
Understand the mechanics of how AI works	131	27%	50%	18%	2%	2%
Understand the potential for AI to benefit people and society	126	28%	45%	18%	4%	5%
Understand the potential dangers of AI to people and society	129	24%	41%	21%	7%	7%
Apply AI concepts to complete a task	129	17%	47%	28%	3%	5%
Understand how and why AI applications may be biased	128	25%	38%	18%	10%	9%
Understand ethical implications of AI	128	25%	35%	24%	7%	9%
Understand how AI applications may use data in ways that raise concerns about privacy	129	26%	33%	22%	5%	13%
Understand how they themselves can contribute to shaping the future of AI	128	22%	38%	26%	7%	8%
Understand why AI applications may raise concerns about equity	127	21%	36%	15%	16%	12%
Use AI to solve problems creatively	130	15%	42%	30%	6%	8%
Use AI to create novel artifacts	128	12%	34%	24%	13%	17%

Note. Respondents were instructed to indicate "N/A" if the particular curriculum they used did not address an item. Items are listed in descending order based on the total percentage of implementers indicating the curriculum improved this aspect of AI literacy "A lot" or "Some".

The Efficacy of ChatGPT In School

For *ChatGPT in School* only, implementers were asked to indicate how much they felt the curriculum helped their students learn about specific topics related to ChatGPT itself and to chatbots and large language models (LLMs) more generally. Between 23 and 26 implementers responded to each of the items shown in Table 18 below. More than two thirds of these implementers indicated that the curriculum taught students some or a lot about every topic listed. The curriculum appears to have been most helpful in teaching students how ChatGPT works, what it is, its benefits and limitations, how a chatbot works, and appropriate and inappropriate uses of ChatGPT in education (Box 3 provides an example of a student-recommend policy on ChatGPT). Topics that could be emphasized more in the curriculum going forward include how LLMs may impact our society, and ethical concerns related to large language models.

Table 18. Implementers' Ratings of the Extent to Which ChatGPT in School Helped Students Learn

Topic	Not much	A little	Some	A lot	Some + A lot
How ChatGPT works will discuss back to me in front of me two minutes	0%	4%	38%	58%	96%
What ChatGPT is	0%	4%	36%	60%	96%
Benefits of ChatGPT	0%	8%	38%	54%	92%
Limitations of ChatGPT	0%	8%	35%	58%	92%
How a chatbot works	4%	4%	40%	52%	92%
Appropriate and inappropriate uses of ChatGPT in education	4%	4%	40%	52%	92%
What a chatbot is	4%	8%	36%	52%	88%
What a large language model is	4%	9%	48%	39%	87%
How ChatGPT is different from other technologies such as search engines	4%	12%	23%	62%	85%
How a search engine works	4%	12%	36%	48%	84%
How large language models may impact our society	4%	24%	40%	32%	72%
Ethical concerns related to large language models	4%	28%	28%	40%	68%

Box 3. Example of Student Recommendation for a School Policy on ChatGPT Use

One of the activities in the *ChatGPT in School* curriculum involved students devising recommendations for a school policy on student use of ChatGPT for school-related work. Survey respondents were invited to share examples of their students' recommendations. The following unedited example was provided by a teacher of 15-16-year-old students (9th grade) in Maryland, USA:

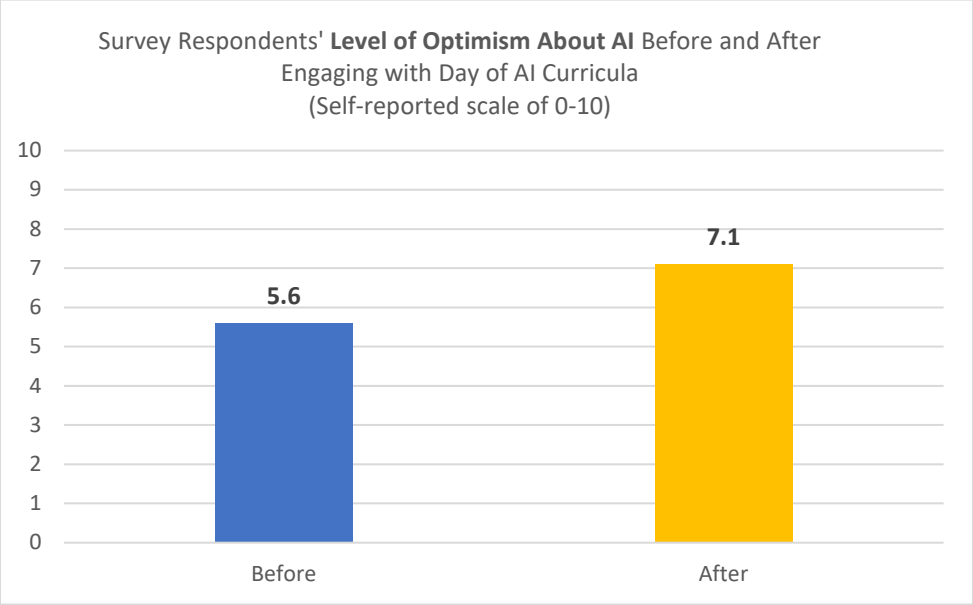
Based on the limitations and advantages of AI generated tools such as ChatGPT, I believe that it would be beneficial to add a policy on said tools to our schools Acceptable Use Policy. I think that AI generated tools should be acceptable to use for instances such as outlines, feedback/comparisons on one's previous work, and if one is stuck and needs inspiration for an assignment. However, there should also be restrictions. For example, it should not be used to write a whole essay and students should not be allowed to copy AI ideas that are not their own.

4. What impact is the Day of AI content having on teacher and student perceptions of AI and their sense of agency in determining its place in their future?

How Day of AI Curricula Influenced Survey Respondents' Level of Optimism About the Potential Benefits of AI to Society

All survey respondents were asked to indicate on a scale of 0-10 their level of optimism about the potential benefits of AI to society before and after engaging with the Day of AI curricula (a score of 0 indicates not at all optimistic and a score of 10 indicates very optimistic). A paired samples t-test found a significant difference in score before (M=5.6, SD=2.39) and after (M=7.1, SD=2.10); t(256)=11.005, p<.001. Figure 3 below provides a graphical description of these results. Respondents noted that it was helpful to see practical examples of AI being used to facilitate tasks, and that the focus on ethical use of AI helped alleviate concerns about misuse of AI. Box 4 showcases a number of implementers' comments about how the Day of AI curricula influenced their level of optimism about AI.

Figure 3. Increase in Survey Respondents' Level of Optimism About AI Before and After Engaging with Day of AI Curricula



Note: Results are based on 257 survey respondents who provided a level-of-optimism score for both before and after engaging with the Day of AI curricula.

Extent to Which Survey Respondents Felt They Could Contribute to Shaping the Future of AI

Survey respondents varied in the extent to which they felt they could contribute to shaping the future of AI (See Figure 4) with 57% of those answering this question indicating they could contribute "a lot" or "some." However, 43% reported feeling they could only contribute "a little" or "not at all".

Box 4. Survey Respondents' Comments About How the Day of AI Curricula Influenced Their Optimism About the Potential Benefits of AI to Society

Please explain how engaging with the Day of AI curriculum influenced your optimism about the potential benefits of AI to society.

Survey respondents were asked to write open-ended responses in answer to the question above. Common themes that arose included an increased level of optimism due to learning about practical ways in which AI is already being used in daily life to improve the accuracy and efficiency of tasks, especially in medicine and in education; the potential to help people with special needs; and the curricular emphasis on ethical and responsible use of AI. Issues that reduced optimism included the speed at which AI is evolving, the lack of governance about how it is used, misuse of personal data, bias, misinformation, and human-computer relations. The following verbatim responses provide examples of these themes.

Teacher in Maryland, US who taught *ChatGPT in School* to 65 general education students aged 15-16 during regular class hours:

I feel more optimistic about the spread of AI now that I know there is a concerted effort to teach our youth about how it works, the benefits and risks, and how it could be effectively and ethically used in the classroom.

Teacher in Australia who taught the *Secondary School Years 9 & 10* curriculum to 50 general education students aged 13-16 during regular class hours:

…the materials did lift my optimism as a very responsible approach was taken around ethics in particular. Like all technology it can be used for both good and bad and the focus on ethics brought those important discussions to the forefront and as a society the opportunities and challenges we have ahead…

Curriculum coach in New York, US who taught *What Can AI Do?* to 600 students aged 5-21 during regular class hours or students' free periods:

I have students with disabilities and I can see many benefits in how AI can help even the playing field for our students.

Tutor in Egypt who taught *What Can AI Do?*, *Can Machines Be Creative?*, and *ChatGPT in School* to a handful of students aged 5-14 as part of end-of-term activities, summer school, or during lunch:

The Day of AI curriculum … introduced me to a number of real-world applications of AI that are already making a positive impact on people's lives. For example, I learned about how AI is being used to improve education, and Underwater Robotics.

Teacher from Maryland, US who used the resources from *ChatGPT in School* and *AI in Social Media* to create their own school-wide lessons about ChatGPT:

Honestly, the more I learned about AI, including the potential for misinformation and bias, the less optimistic I became.

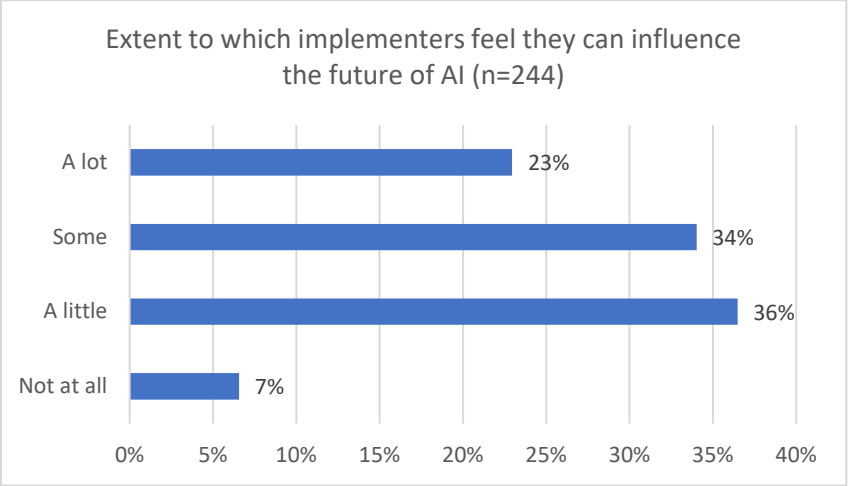
Teacher from Colorado, US who taught *AI in Social Media* during regular class hours to 10 general education students 15-18 yrs old:

Deep Fakes, gathering and utilization of personal data, AI in the form of human looking robots has let [led] to some concerns related to AI

Teacher/Curriculum Coach from a Title I school in Connecticut, US who taught *Teachable Machines*, *Can Machines Be Creative?*, and *Intro to Voice AI (with Amazon Future Engineer)*

We watched the hearing before the US Senate subcommittee on Tuesday, May 16th. My students and I were very disappointed with how evasive and insincere OpenAI's CEO was, as well as how unprepared our government leaders are.

Figure 4. Extent to Which Implementers Felt They Could Influence the Future of AI



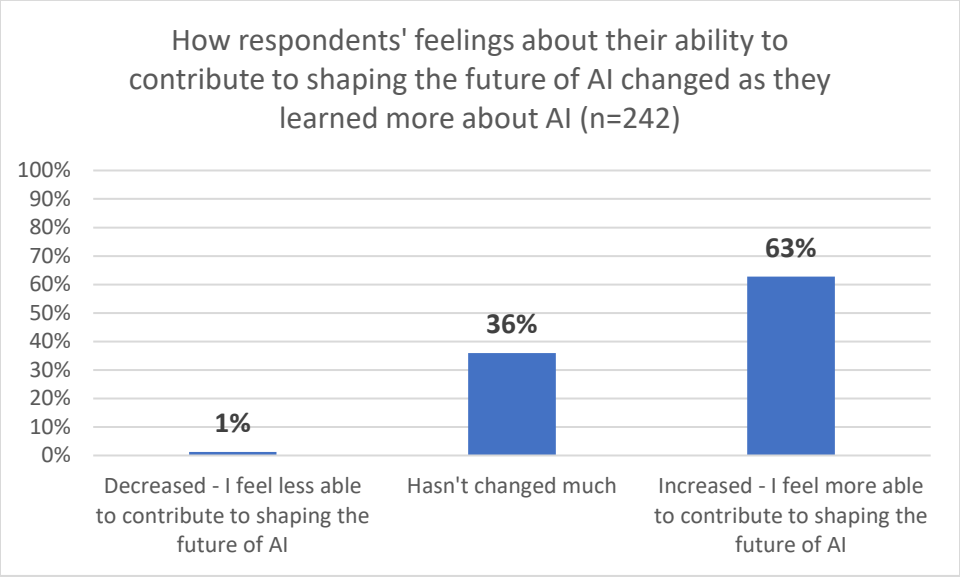
How Feelings About the Extent to Which Survey Respondents Could Contribute to Shaping the Future of AI Changed as They Learned More About AI

For almost two thirds of the survey respondents, learning more about AI gave them more confidence in their ability to contribute to its future (Figure 5). The majority of these respondents felt they could exert influence by teaching their students about AI. For example, a teacher in a district school in Alabama wrote "*As an educator, I feel that exposing the students to AI, teaching them the basics of AI and addressing the social concerns is a vital part of shaping the future of AI. These students will be the ones to be the main contributors to the growth and expansion of AI.*" Respondents who coach or train teachers felt they could influence the use of AI to facilitate teaching by colleagues and trainee teachers, and prepare them to teach students about AI. A professor of teacher education in New Jersey explained: "*I think I can share some insights with my preservice teacher candidates and I think I can think more imaginatively about workplace applications in teacher education and education in general*."

Many of the respondents who reported feeling no change in their ability to influence the future of AI explained that, while they felt limited power themselves, they expected or hoped their students would have more influence. A teacher in a district school in New Hampshire who claimed no ability to influence the future of AI herself exemplified this sentiment: "*I'm just a middle school teacher. One of my students may shape the future of AI.*"

Encouragingly, only 1% of the respondents reported that learning more about AI decreased their confidence in their ability to contribute to the future of AI. A multiracial, female teacher in California working in a remote urban public school expressed her concerns as follows: "*Understanding more about what AI is, how it is being used and who is in control of the train concerns me because the decision-makers do NOT share my values*."

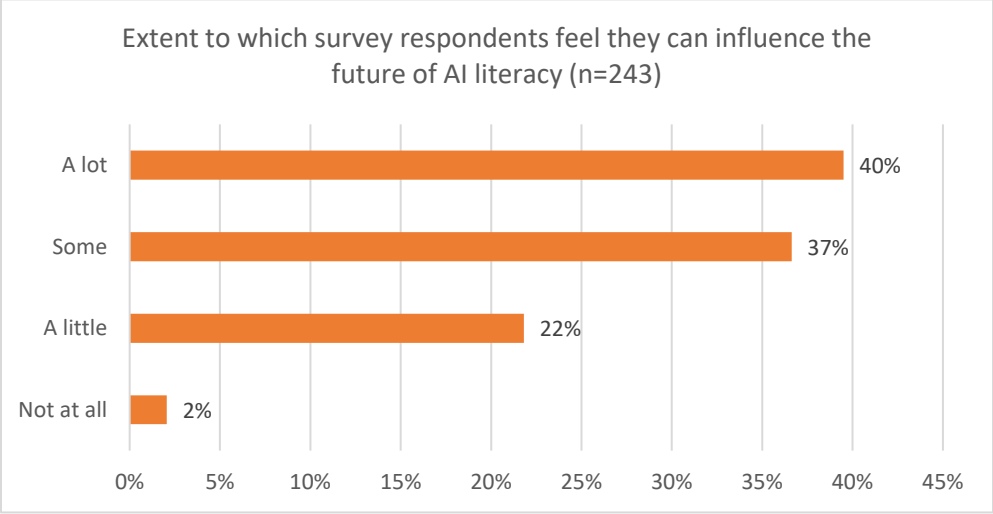
Figure 5. How Survey Respondents' Feelings About Their Ability to Contribute to Shaping the Future of AI Changed as They Learned More About AI



Extent to Which Survey Respondents Felt They Could Contribute to Shaping the Future of AI Literacy

Respondents were generally more positive about their ability to contribute to shaping the future of AI *literacy* (i.e., people's ability to understand the role of AI in our lives, to evaluate its pros and cons, and to use it productively) than about their ability to shape the future of AI itself: 77% of respondents who answered this question felt that they could contribute to the future of AI literacy a lot or to some extent, with less than a quarter feeling they could only contribute only a little or not at all (Figure 6).

Figure 6. Extent to Which Survey Respondents Feel They Can Influence the Future of AI Literacy



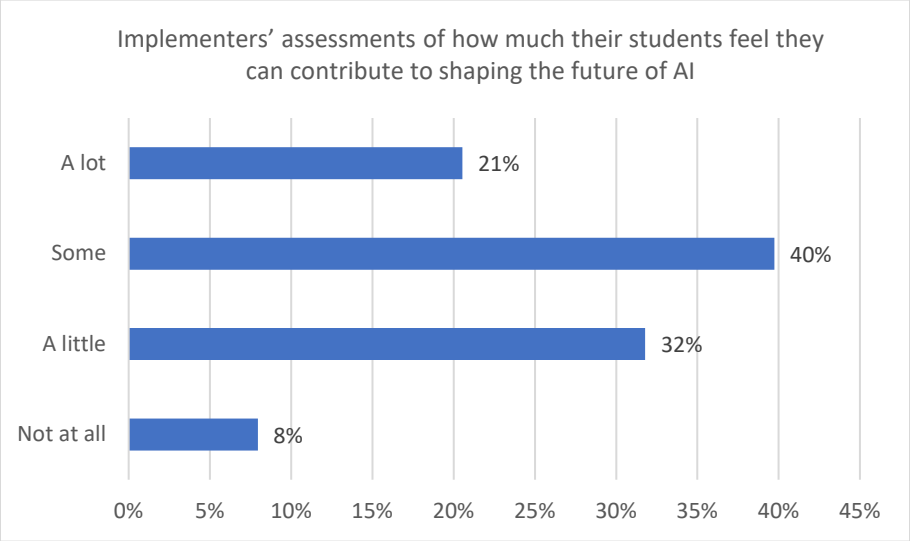
How Day of AI Curricula Influenced Students' Optimism About the Potential Benefits of AI to Society

Implementers were asked to rate their *students*' level of optimism about the potential benefits of AI to society before and after they had implemented the curriculum. Results are shown by curriculum in Table 16. The weighted average score across curricula increased from 5.0 to 6.7.

How Much Implementers Think Their Students Feel They Can Contribute to Shaping the Future of AI

Sixty-one percent (n=151) of implementers reported that their students felt they can contribute a lot or to some extent to shaping the future of AI (Figure 7). Seventy-seven percent (n=151) of implementers reported that this sentiment increased as students learned more about AI. Some explained that students had begun to understand how their own data are being used in AI models and that their use of AI applications might contribute to training the models. For example, a teacher in Australia commented that: "*After the day, I think their eyes are opened to the fact that their data is the primary driving factor, over which they have at least some control.*" An interviewee from the US recounted an instance of a student pushing back on what they felt as unwanted imposition of AI in their lives by deliberately feeding incorrect data to an AI model to train it in the wrong direction.

Figure 7. Implementers' Assessments of How Much Their Students Feel They Can Contribute to Shaping the Future of AI



Other implementers suggested that students saw a more active future role for themselves in developing AI applications. For example, a teacher in New York who delivered *Teachable Machines* to one hundred 9-12-year-olds asserted that: "*Students are understanding how AI is being used and created and they are understanding that they can become programmers and creators of this technology and not just passive users of it*." For a few students, that moment of control had already arrived: a teacher in North Carolina teaching the same curriculum commented "*I had one student who leapt out of their seat when they tested their Teachable Machine model & it worked! They were using it to assess the ripeness of produce & envisioned a future in which robots would do our grocery shopping…*" See Box 5 for an excerpt from the follow-up interview with this teacher.

Twenty-three percent of the implementers indicated that students' feelings about their ability to shape the future of AI had not changed, often explaining that it would take more time on the topic to have an

impact. For example, a teacher in California who spent 3 hours over 3 sessions delivering *Game AI* to one hundred 11-12-year-olds noted that: *"learning about anything requires more than 1 exposure."* An interviewee from Ohio lamented that her middle and high school students generally feel that adults are pushing AI applications on kids while they themselves have little say in the matter.

Cultural Relevance, Equity, and Social Justice

Implementers were asked to rate the Day of AI curricula on how well they addressed issues of equity and social justice, and on how culturally relevant they were for their students. Results are shown in Table 19.

All 15 curricula scored six or higher on a scale of 0 (not at all) to 10 (very) for cultural relevance, averaging 7.0. A culturally relevant curriculum was defined for respondents as one that "*affirms and validates students' cultural identities and experiences; is inclusive and representative of diverse perspectives and cultures*." Average ratings for the curricula on how adequately they address issues related to equity ranged from 3 to 10 on a scale of 0 (not at all) to 10 (very well) with an average of 6.1. Average ratings for the curricula on how adequately they address issues related to social justice ranged from 2.7 to 10 on a scale of 0 (not at all) to 10 (very well) with an average of 6.0. Neither equity nor social justice were defined for respondents which may have resulted in different understandings of these questions. In particular, respondents' written comments suggested that many of them were not particularly clear on the meaning of social justice and how it might apply to a curriculum.

Box 5. Lightly Edited Excerpt from Teacher Interview Showcasing How Students Were Developing Own AI Applications to Help Individuals with Disabilities

This excerpt is from an interview with the teacher based in a Title I magnet school in North Carolina, USA who taught *Teachable Machines* to a group of nine 11-14-year-olds as part of an Emerging Technologies course.

They have to use Teachable Machine to…design some sort of AI solution that can help people with disabilities. And then they have to make a prototype of that using Teachable Machine… They do really well… I had a student…where his idea was that if somebody is color blind then it might be more difficult for them to be able to pick out produce without being able to touch it. And so he trained Teachable Machine on red delicious apples. And so we found lots of pictures on the Internet of apples that were underripe and overripe and just right. And so he was able to train it. And then we showed it some other pictures and it worked really well. He was very excited, like jumped out of his chair. He was like "I'm going to make this happen!"

Then… we extend that a little bit further …with so now… you've got something on your phone you can hold up to the display of apples and have it pick one for you that's your desired level of ripeness… In my mind, I was like maybe you could come up with something that actually picks produce, like a robot that can pick produce off the tree in an agricultural setting that is the desired amount of ripeness. But his thought process actually went to having robots do the grocery shopping for us… If the AI could tell how ripe the apple is, then you could say 'I want 5 ripe apples' and now the robot could actually pick them out at the stand at the grocery store.

…I had another student…his idea was to add lip reading and speech recognition to make auto captions a little bit better… We tried using Teachable Machine for that but it wound up not being the best tool.

Table 19. Implementers' Average Ratings of Curricula on Cultural Relevance and on Addressing Issues Related to Equity and Social Justice

Curriculum	No. of implementers providing feedback on this curriculum	Teachers' ratings of curriculum's cultural relevance for their students (0-10 scale)	Teachers' ratings of how well the curriculum addressed issues related to equity (0-10 scale)	Teacher's rating of how well the curriculum addressed issues related to social justice (0-10 scale)
What Can AI Do?	55	6.5	5.6	5.7
ChatGPT in School	32	7.2	6.3	6.2
Intro to Voice AI	26	7.3	6.1	5.1
Teachable Machines	21	7.2	7.2	6.9
Can Machines Be Creative?	15	6.8	6.4	6.0
AI in Social Media	10	7.1	6.0	6.1
Game AI	9	7.4	6.3	6.1
AI Blueprint Bill of Rights	4	8.3	5.3	6.0
Data Science and Me (no coding version)	3	10.0	10.0	10.0
Personal Image Classifier	3	6.0	3.0	2.7
Data Science and Decision Making	1	-	-	-
Data Science and Me (coding version)	1	8.0	9.0	10.0
Curricula offered in Australia only				
Secondary School Years 9 & 10	3	8.0	6.3	7.0
Secondary School Years 7 & 8	1	9.0	8.0	7.0
Primary School Years 5 & 6	0	-	-	-
Total/Weighted Average	184	7.0	6.1	6.0

5. How are Day of AI activities being integrated with existing schedules and activities?

When Day of AI Curricula Were Implemented

In the majority of cases, Day of AI curricula were implemented during regular class hours. Table 20 below shows other times during which the curricula were implemented. The three respondents from Australia who answered this question all noted that they spent one entire school day on the curriculum.

Table 20. When Day of AI Curricula Were Implemented

When Day of AI curricula were implemented	% of implementations that were delivered during this time (n=184)
During regular class hours	80%
Before or after school	6%
During lunch	4%
As part of end-of-term activities	4%
As part of summer school	3%
During a free period for students	3%

Note. Respondents could select more than one time during which they implemented a curriculum. Additional times not listed in the table but indicated by only 1-2 respondents included weekend time, library specialist time, during library coding club, as part of an afterschool camp, as part of an extended exam day class schedule, as part of a government-funded summer program, during a high school assembly, and during workshops for teachers during or after school.

Time Spent Preparing to Teach the Curricula

Implementers were asked how many hours they spent preparing to teach each Day of AI curriculum (e.g., reading the educator guide, watching tutorial videos, attending training, reviewing/editing slides, planning adaptations, translating, gathering materials and equipment). Among the 171 implementers who answered this question, the number of hours ranged from 0 to 20 as shown in Figure 8. The mean preparation time was four hours and the median was two hours.

The average amount of time students spent engaging with the Day of AI curricula ranged from 2.3 hours for *Personal Image Classifier* to 8.5 hours for *AI Blueprint Bill of Rights*. Table 21 below shows the developers' estimates of hours to implement the curriculum in Column 4 and the average number of hours students spent on each curriculum in Column 5. Note that, as with previous tables, greater confidence should be placed in results where a larger number of implementers provided feedback. For nine of the curricula, the average amount of time spent by students exceeded the developers' estimates although this may, in some cases, have been due to the teachers' adaptations. Column 6 in the same table indicates the number of lessons in each curriculum and Column 7 indicates the average number of sessions over which the curricula were taught.

Additional Resources Used to Learn and Teach About AI

Among the 265 survey respondents, 75% indicated that they have learned about AI from additional sources beyond the Day of AI curricula. Seventy of the 190 implementers named a variety of resources they used to supplement the Day of AI curricula. These are listed in Box 6 and include teacher-developed activities/materials, videos, articles, books, EdTech tools and platforms, and online games.

Figure 8. Number of Hours Teachers Spent Preparing to Deliver Day of AI Curriculum

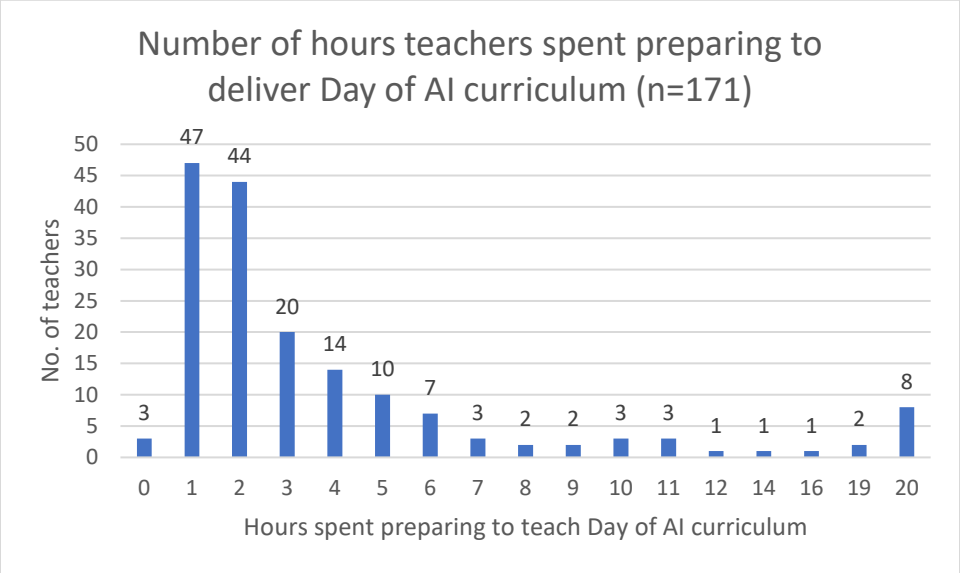


Table 21. Implementation of Day of AI Curricula: Teacher Preparation Time, Delivery Time, Number of Sessions

Curriculum	No. of implementers providing feedback	Avg prep time for teachers (hrs)	Developers' estimate # of hrs to implement	Avg # of hrs students spent on curriculum	No. of lessons	Avg # of sessions
What Can AI Do?	55	3	4.0	4.2	4	3.6
ChatGPT in School	32	4.5	3.5	5.0	4	3.6
Intro to Voice AI	26	3.9	1.0	3.8	1	3
Teachable Machines	21	4.5	3.0	2.8	5	3.4
Can Machines Be Creative?	15	6.4	3.5	4.9	5	4.9
AI in Social Media	10	3.7	4.0	3.4	8	2.7
Game AI	9	4.6	3.2	3.5	4	2.9
AI Blueprint Bill of Rights	4	6.75	4.8	8.5	7	6
Data Science and Me (no coding version)	3	5.5	4.3	8.3	6	6
Personal Image Classifier	3	3.3	3.6	2.3	6	2
Data Science and Decision Making	1	-	6.3	-	9	-
Data Science and Me (coding version)	1	2	5.8	7.0	8	5
Curricula offered in Australia only						
Secondary School Years 9 & 10	3	4	5.2	6.0	5	4.3
Secondary School Years 7 & 8	1	3	5.2	5.0	5	5
Primary School Years 5 & 6	0	-	3.75	-	5	-
Total/Weighted Average	184	4.1		4.3		3.6

Box 6. Additional Resources or Materials Used Beyond Those Suggested in the Day of AI Teacher Guide

Articles/news sources
Article from Scientific American
Articles from state-provided databases
Articles from the New York Times
Articles found online
NPR news stories about AI

Books
Max Tegmark: Life 3.0: Being Human in the Age of Artificial Intelligence
Michio Kaku: Future of Humanity
Nick Bostrom: Superintelligence: Paths, Dangers, Strategies

EdTech Tools and Platforms
Flocabulary
Google Classroom - Code.org
Mouse Create
Padlet
Pear Deck

Games
AI bingo
Akinator
Semantle

General supplies, gadgets, and equipment
Apple Watch
Headsets
Manipulatives
Posters
Promethean Board
Prompt books
Telephone
Voice recorders

Instructional Programs, Activities, Lessons
BrightCHAMPS
Code.org's AI for Oceans
Code.org's Hour of AI
Common Sense Media lesson: "Artificial Intelligence: Is It Plagiarism?"
Google's AI curriculum
Google ML experiments
ISTE's Hands-On AI Projects for the Classroom: A guide on Ethics and AI
Minecraft Education Edition's AI lesson
Scratch handwriting recognition program
Scratch machine learning

Online AI Tools and Applications
AutoDraw
Dall-E 2
Google Translate
Nightcafe AI art generator

Organizations/Initiatives
Code.org
Future of Life Institute
Google AI
Midjourney
TeachAI.org

Programming Languages
Python
Scratch

Robots
Cozmo robot to demonstrate facial recognition
Vector robots

Software
Adobe Aero (augmented reality)
Google Slides

Teacher-Developed Activities/Resources
Activity on meta tags
Activity to develop handwriting recognition algorithm
AI Tools Choice Board
Created websites with links to AI sites for students to try
Demo of artificial neural networks classifying 2D data
Own unit on AI including some of the Day of AI materials
"In real life" ways to teach machine learning
Reflection sheet for students to analyze what they learned and provide feedback
Research projects to investigate different aspects of AI
STEM Project
Strategies from other teachers in professional networks
Style transfer AI models
Translated content
Worked with ELA teacher to develop and deliver this AI & Poetry event

Videos
TED Talks on benefits and risks of AI
Video (in Spanish) How does ChatGPT Work?" The AI Revolution
Video on Seeing AI
Youtube videos, e.g., explaining how ChatGPT works to introduce machine learning

Other
Future Makers Mobile Lab from Wichita State University
Information from AI conferences and discussions with other library and AI professionals
Internet/Google search
Team from Digital Dream Labs, Pittsburgh, PA, to present on AI and set up hands-on learning centers for students to explore sight, sound, obstacle recognition, and touch
Statistics teacher to explain stats behind recommendation systems

6. How can the Day of AI activities be improved to actively engage more teachers and students?

Helpfulness of Resources Provided for Each Day of AI Curriculum

Implementers were asked to rate the helpfulness of the resources provided for each of the Day of AI curricula. As shown in Table 22, the majority of implementers found the educator/teacher guide, tutorial videos, teacher slides, and student resources very helpful. Implementers accessing the curricula on the Day of AI Australia website could also download a teacher schedule and student slides but only a small number of these implementers responded to the survey.

Table 22. Implementers' Ratings of the Helpfulness of Resources Provided for the Day of AI Curricula

Curriculum resource	No. of responses	N/A	Did not use	Not very helpful	Fairly helpful	Very helpful	% very helpful
Educator/Teacher guide	173	1	5	3	45	119	69%
Tutorial videos	165	7	13	8	35	102	62%
Teacher slides	170	-	2	1	33	134	79%
Student resources	170	4	12	6	41	107	63%
Teacher schedule (Australia only)	4	-	-	-	-	4	100%
Student slides (Australia only)	4	-	-	-	2	2	50%

Note. Not all resources were provided for each curriculum.

Ratings of the helpfulness of the educator/teacher guides are shown by curriculum in Table 23.

Table 23. Implementers' Ratings of the Helpfulness of the Educator/Teacher Guide by Curriculum

Curriculum	No. of responses	N/A	Did not use	Not very helpful	Fairly helpful	Very helpful	% very helpful
What Can AI Do?	51	0	1	1	17	32	63%
ChatGPT in Schools	31	0	1	1	10	19	61%
Intro to Voice AI	25	1	1	1	5	17	68%
Teachable Machines	20	0	1	0	1	18	90%
Can Machines Be Creative?	14	0	1	0	3	10	71%
AI in Social Media	10	0	0	0	2	8	80%
Game AI	8	0	0	0	6	2	25%
AI Blueprint Bill of Rights	4	0	0	0	1	3	75%
Personal Image Classifier	3	0	0	0	0	3	100%
Secondary School Years 9 & 10	3	0	0	0	0	3	100%
Data Science and Me (no coding)	2	0	0	0	0	2	100%
Data Science and Me (coding version)	1	0	0	0	0	1	100%
Secondary School Years 7 & 8	1	0	0	0	0	1	100%
Data Science and Decision Making	0	-	-	-	-	-	-
Total	173	1	5	3	45	119	

Suggestions for Improving the Day of AI Materials

Educators were almost invariably very complimentary about the quality of the Day of AI materials and greatly appreciated the ability to readily adapt materials as needed for their own contexts. The following comment from a teacher/curriculum coach in Guatemala who taught *What Can AI Do?*, *Teachable Machines*, and *ChatGPT in School* exemplified numerous expressions of appreciation:

> *Everything is wonderful. I think the resources are great as they are for any teacher that has little time to prepare. It is great to be able to make a copy and also personalize the resources. I would also like to congratulate and thank you for making sure the resources were available in Spanish. I shared it [with] my professional networks and social media. Latin America is a very important niche and where people need more and more information.*"

Improving Student Engagement

The majority of suggestions for improvement related to ways of minimizing didactic approaches to teaching in order to improve student engagement with the materials. As one interviewee noted, hands-on, interactive activities help students "*internalize what's going on*." Educators suggested ideas for improving student engagement that were categorized as follows:

- More opportunities for interaction/Q&A with students, e.g., including quizzes, using tools such as Pear Deck, Curipod, Padlet
- Expand the lessons further/add more information/offer more advanced content and extensions
- More games/game-like activities
- More videos and video tutorial explanations for students and teachers
- More examples and more real-world examples
- More hands-on activities
- More project-based learning/opportunities for students to explore concepts and content and discover for themselves
- Shorten amount of time the teacher is "instructing" vs. students engaging with content/apps
- More independent activities for students

One of the more popular activities was "AI or Not?" in which the teacher shows students a series of slides with pictures of items including a toaster oven, automatic door, face filter, and a virtual assistant. Students apply a consistent set of questions to determine whether each item needs AI to operate. Numerous educators commented that the students enjoyed this activity and would like to have seen more examples. Younger students also greatly enjoyed creating algorithms to instruct their teacher to execute an activity such as stacking blocks or exiting the classroom. An interviewee emphasized the importance of engaging students in activities and concepts to which they could easily relate now as opposed to focusing on how the skills and knowledge being taught would be useful in the future. He observed that discussions about careers related to AI could easily lead to students switching off if they did not expect to pursue such careers and therefore assumed that the Day of AI content would not be relevant to them. But he noted that even small children care about issues like fairness, bias, and stereotypes.

Multiple interviewees suggested that there were too many teacher slides for elementary and middle school children to sit through and that the students needed to be able to write and do things in order to digest the content. An interviewee who taught *Teachable Machines* to third and fourth graders (mostly 9-10 years old at the end of the school year) in New York City suggested that providing sequenced content for multiple grades would allow teachers to build on concepts from one year to the next. She also noted that more age-appropriate examples would be helpful as students of this age in her school are not typically

using Instagram and SnapChat. In addition, while this teacher felt the topic of bias was important to include, she felt the video used was more appropriate for older students.

Improving Accessibility of the Day of AI Materials to More Educators and Students

Other suggestions for improvements focused on improving accessibility of the materials to more educators and students. These were categorized as follows:

- Training for teachers on how to implement the curricula
- Improve accessibility of content/apps including for people with disabilities [as per Sections 504 and 508 of the Rehabilitation Act of 1973[5]]
- Translations into other languages
- Resources for iPads and MacBooks
- Provide a troubleshooting guide/clearer instructions for AI apps used in curricula
- Make the curricula available earlier in the academic year
- More explanation of terms for students for whom English is not a first language
- Provide materials/supplies
- Reference sheet for terms used
- Offer alternative resources for those that may be blocked by schools/districts
- Providing content that is accessible via social media

Interviewees generally conveyed that some kind of training, whether provided externally or organized internally at their schools, would be helpful and should be differentiated for teachers with different levels of knowledge and comfort with technology and computer science. One interviewee from a school in which 16 elementary school classroom teachers, a counselor, a science teacher, and the librarian all implemented Day of AI curricula suggested that 2-3-minute video snippets of how Day of AI curricula are being implemented in a real classroom with students would be helpful. For example, a video showing how the students are using *Quick, Draw!* including a screencast of what it looks like in use.

While for some teachers, references to accessibility meant making the Day of AI content more usable by students with disabilities and teachers with no computer science background, a few were apparently unable to download all the materials or access applications online. It is probable that in some or all of these instances lack of access was due to blocks implemented by the school districts or other supervisory entities. For example, a Romanian teacher noted that the Ministry of Education determines "accreditation" of educational platforms.

Interviewees mentioned that they were not aware of all the Day of AI curricula that were available because they had visited the website and downloaded the materials before some of the curricula were added (for example, *ChatGPT in School*).

One interviewee suggested that an online gallery of completed student projects would be useful for other teachers and students to view. Another interviewee suggested making it very clear on the Day of AI website that no budget commitment for materials or training is required in order to implement Day of AI curricula.

[5] See https://www.hhs.gov/web/section-508/what-is-section-504/index.html

Maintaining or Improving the Quality of the Materials

Some educators suggested ways to maintain or improve the quality of the Day of AI content and resources. These included:

- Use clearer examples and explanations
- Better organization of content on website and in materials
- Keep content up to date each year with new AI tools and how they are being used
- Eliminate repetitive content
- Provide more resources
- Use AI resources like Curipod
- Provide differentiated activities
- Suggest ways for teachers to adapt the content to connect with their specific students
- Offer certificates of completion for students who complete tasks or projects

In a few instances, teachers highlighted a concept — for example, General Adversarial Networks — that was difficult for them and/or the students to understand and asked for simpler or additional explanations. An instructor teaching *Game AI* asked for a better explanation of reinforcement learning and "*the game of 'What's the rule' using a video*" and noted that *"…it was hard for me to understand how exactly worked the Q-Tables and blocks of AI in the Scratch PRG interface. How were they obtained? Despite knowing very well Scratch, I am not an AI experienced programmer, and I had trouble to understand the connections between Scratch and AI*." Several instructors teaching *AI in Social Media* suggested revisions to improve the lesson on recommendation systems, particularly the explanations of K-means clustering and the DATAtab activity. Two educators implementing *Data Science and Me* were skeptical of the Daisy Model activity in which students are expected to share personal information about themselves with other students. One of these educators explained that students had lost progress in social interactions during the COVID-19 pandemic and still struggle to share information with each other, rendering this activity difficult to implement.

A number of educators indicated an expectation that the curricula will become quickly outdated given the rapid pace of change in this area. Additionally, some educators indicated that they would like to be able to revisit the topic of AI literacy each year with the same students so refreshing the curricula with new or more flexible activities, and/or providing a more coordinated and sequenced progression of curricula would be useful. Interviewees articulated the challenge for teachers to cobble together cohesive programs of AI literacy instruction for their students given the recent proliferation of AI-related resources and curricula from a variety of organizations. They indicated that guidance from a credible actor like MIT on reliable curricula, resources, online courses, or open educational resources would be helpful. Additionally, direction on how to progress beyond implementing the existing Day of AI materials to help prepare students for what they will encounter in college would be appreciated.

In a small number of instances, teachers pointed out minor errors in the materials, often simply spelling, grammatical, or formatting issues, or a broken link to a video or other resource that had been moved to a different digital location or was no longer available. In addition, a few educators commented that a topic or concept was missing from a curriculum without realizing that it was covered in another curriculum.

Making the Day of AI Curricula More Culturally Relevant

Implementers were asked for suggestions as to how the Day of AI curricula could be made more culturally relevant for their students. Suggestions included:

- Include ways to introduce AI and its potential benefits to parents who may act as gatekeepers preventing their children from using and learning about it

- Focus on important current trends
- Find voice activation tools that can recognize different accents or ways of speaking
- Use current social media that teenagers from different racial/ethnic groups are using
- Use apps where students can customize the digital environment to make it relevant to themselves
- Include an independent exploration activity, e.g., an AI tools journal where each student chooses an AI tool to explore based on their interest
- Include individuals/characters/data representing people from different backgrounds/races
- More game-based or interactive activities
- Facilitate use of curricula on mobile devices including phones and iPads
- Add non-US centric examples
- Focus on how AI can help with English Language Learners
- Use apps that have 3D environments as this is what students are used to from apps they already use like Roblox, Minecraft
- Integrate more apps that students are already engaged with, e.g., Minecraft
- Provide names and images of scientists who contributed to AI development
- More focus on diverse engineers who have developed AI
- Include more information on how AI can help improve everyone's lives
- Include AI activism
- Include activities that allow students to use AI-based tools for a typical school task/assignment
- Use examples that are relevant to situations in which teenagers find themselves
- Offer a variety of examples/projects that may be relevant to students from different locales, racial/ethnic groups, cultures
- More focus on bias in AI, its real-world consequences, and harms caused to people of color
- Provide information about culture, customs, traditions, historical places

Interviewees from abroad suggested a few ways to make the content more culturally relevant to non-US students, for example, replacing statistics on social media use in the US with local statistics from their own countries and replacing examples based on US presidents with foreign leaders.

Several of the interviewees in the US and abroad offered to help with curricular improvements and local adaptations, and some expressed interest in helping to coordinate Day of AI activities in their region or country. For example, a teacher in Guatemala who trains educators as well as students, expressed enthusiasm about the possibility of establishing a Day of AI Latin America.

How the Day of AI Curricula Could Better Address Issues Related to Equity

Implementers were asked for suggestions as to how the Day of AI curricula could better address issues related to equity. Suggestions included:

- Apply principles of Universal Design for Learning to improve equity [of access to curricular content]
- Improve accessibility of Day of AI curricula
- Include examples of AI-based gadgets/machines that are more affordable to low income families
- Suggest how to help children who cannot afford tech gadgets
- More focus, discussion, and examples on issues of bias and equity in AI, especially in social media apps
- Discuss digital divide and to what extent AI apps are available in different regions/countries and possible consequences for those who do not have access

- Make Day of AI content accessible in different languages
- Use AI apps that recognize different accents
- Differentiate content by age group
- Add examples of AI that include students of color with disabilities and people who have health problems
- More information about bias that affects people with disabilities
- Address how AI can support people with disabilities including difficulty focusing
- Address whether/how AI can help all communities including those that are marginalized
- Ensure that photos of scientists/programmers etc. show a wide of range of ethnicities, genders
- Have student engagement leaders, cultural assistants in the classroom

How the Day of AI Curricula Could Better Address Issues Related to Social Justice

Implementers were asked for suggestions as to how the Day of AI curricula could better address issues related to social justice. Suggestions included:

- Explicitly address how large language models can perpetuate bias
- Add more current, real-life examples of bias in AI, its dangers, and how to apply the concept of social justice
- More examples of AI and social justice that are inclusive and reflect students of color with disabilities
- Add more examples/case studies including some more age appropriate to younger students
- Allow students to explore solutions to bias in AI and/or provide examples of solutions to bias in AI
- Address how AI can be used to identify and combat discrimination
- Address how AI can be used to enhance access to legal aid
- Address how AI can be used to monitor human rights abuses
- Address how AI can be used to promote fair representation in politics
- More information about copyright on content generated with AI and discussion of copyright issues, giving credit/attribution, e.g., for datasets being used
- Provide more information on the right of individuals "to take risks and make mistakes"
- Suggest ChatGPT/chatbot prompts related to social justice
- Discuss how facial recognition is used in surveillance and border-checks at US-Mexico border, in Israel, and how it affects arrest rates for different races, e.g., Johnson, T. L., Johnson, N. N., McCurdy, D., & Olajide, M. S. (2022). Facial recognition systems in policing and racial disparities in arrests. *Government Information Quarterly, 39*(4), 101753
- Discuss AI and human decision-making and how responsibilities are shared
- Address how AI can be used to solve problems of inequality
- Include more information or discussion questions about how social justice issues relate to AI now and may do so in the future

One interviewee suggested providing a list of actions students can take if they are concerned about how AI is being used or how AI is using their data, for example, writing to specific people or joining an organization like Dr. Joy's Algorithmic Justice League that is trying to put boundaries around AI.

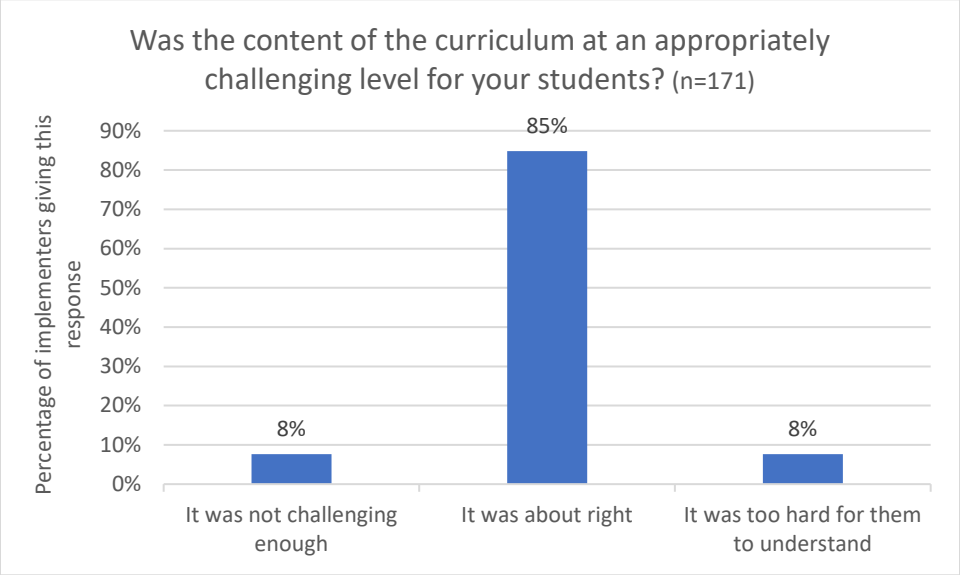
Implementers' Assessments of Whether the Day of AI Curricula were Appropriately Challenging

Implementers were asked whether the content of the curriculum they taught was at an appropriately challenging level for the students. As illustrated in Figure 9, the vast majority indicated that the level of

challenge was about right, with 8% claiming it was not challenging enough and another 8% reporting that the content was too hard for the students to understand.

Implementers who indicated that the curriculum content was either not challenging enough or too challenging were often teaching the curriculum to students older or younger than the recommended age range. Implementers teaching students for whom English is not their first language noted some language barriers. Those teaching students in a computer science class or students who had already been using AI-based tools such as ChatGPT needed more advanced material. A few implementers suggested that additional examples, applications to real-world problems, and activities that encouraged interaction among students would increase the level of challenge.

Figure 9. Implementers' Assessment of Whether the Content of the Day of AI Curriculum Was at an Appropriately Challenging Level for their Students



Responses by curriculum are shown in Table 24. Curricula are listed in descending order by the number of implementers who provided a response to this question.

Curriculum Adaptations

Fifty-five percent of implementers reported that they adapted the curriculum in some way while 45% used the materials without modifications. Table 25 shows the extent to which this varied across curricula. Table 26 lists the ways in which implementers adapted the Day of AI curricula for their own settings. The most common adaptation was omitting or condensing content or modifying activities to fit into the available time or to avoid difficult content. Twenty implementers noted that they either customized the Day of AI resources or created their own slides, notes, guides or worksheets for students. Nineteen implementers described ways in which they adapted the curricula to improve student engagement and provide greater opportunities for interaction: adding more content, real-life examples, hands-on or interactive activities, challenges, quests, questions, quizzes, and discussion topics.

Table 24. Implementers' Assessments of Each Day of AI Curriculum's Level of Challenge

Day of AI Curriculum	No. of responses	It was not challenging enough	It was about right	It was too hard for them to understand
What Can AI Do?	50	5	41	4
ChatGPT in Schools	31	1	29	1
Intro to Voice AI	25	3	22	0
Teachable Machines	21	1	18	2
Can Machines Be Creative?	13	1	10	2
AI in Social Media	10	1	7	2
Game AI	8	1	5	2
AI Blueprint Bill of Rights	4	0	4	0
Personal Image Classifier	3	0	3	0
Secondary School Years 9 & 10	3	0	3	0
Data Science and Me (coding version	1	0	1	0
Data Science and Me (no coding)	1	0	1	0
Secondary School Years 7 & 8	1	0	1	0
Data Science and Decision Making	-	-	-	-
Total	171	13	145	13

Table 25. Frequency and Percentage of Implementers Adapting Curriculum Materials

Curriculum	No. of responses	No, I used the materials as they are	Yes, I adapted the materials	% adapting materials
What Can AI Do?	51	27	24	47%
ChatGPT in School	31	7	24	77%
Intro to Voice AI	25	13	12	48%
Teachable Machines	21	10	11	52%
Can Machines Be Creative?	14	3	11	79%
AI in Social Media	10	3	7	70%
Game AI	9	6	3	33%
AI Blueprint Bill of Rights	4	4	0	0%
Data Science and Me (no coding)	3	2	1	33%
Personal Image Classifier	3	1	2	67%
Secondary School Years 9 & 10	3	2	1	33%
Data Science and Me (coding version)	1	1	0	0%
Secondary School Years 7 & 8	1	1	0	0%
Data Science and Decision Making	-	-	-	-
Total	176	80	96	

Table 26. Ways in Which Implementers Adapted the Day of AI Curricula

Adaptations made by implementers to Day of AI curricula	No. of implementers making this adaptation
Omitted/condensed content or modified activities to reduce time requirement or skip difficult content	21
Made own slides/notes/guides/worksheets for students or customized Day of AI slides	20
Added content, real-life examples, hands-on or interactive activities, challenges, quests, questions, quizzes, discussion topics	19
Combined with other resources including technology, news articles, videos	11
Adapted for younger/older students, for varying background knowledge levels, or for special needs	9
Used resources in own pre-existing lesson plans, projects, or courses	6
Offered various options or created opportunities for students to go beyond the curriculum	5
Included other AI tools and concepts	5
Found ways to connect content and activities to other learning or ongoing projects	5
Language translation	3
Added local context and/or changed examples/made connections to which the students could better relate	3
Corrected minor errors in slides/student materials	1

Conclusion

While the present evaluation is purely descriptive and based on self-report data from Day of AI registrants and implementers, it provides a promising indication that AI literacy curricula can reach a wide audience and improve knowledge, awareness, and optimism about AI's role in students' lives and their ability to influence it. The reach of the Day of AI curricula is remarkable for content that has only been available for 1 to 2 years and that is implemented by educators on a voluntary basis. The reported impact is also impressive given how little time students engage in the curriculum content relative to other topics and subjects they study. Future studies could include student-level data and could include pre- and post-assessments of educator and student AI literacy to more rigorously evaluate impact. Recommendations below suggest ways in which reach and impact may be increased beyond educators who are first movers in introducing new content and concepts to their students and colleagues.

Recommendations

To build on the early successes of the Day of AI initiative and to further increase its reach and impact, MIT RAISE could consider the following recommendations:

I. Increase Outreach to Education Decision-makers Who Can Institutionalize AI literacy Instruction

To significantly expand the reach of the Day of AI curricula, outreach must go beyond engaging individual teachers who have the flexibility to decide what they teach their students and aim to influence decision-makers who could potentially institutionalize AI literacy instruction. Such decision-makers include state-level actors such as state boards of education and state education agency leaders; district or network level actors such as superintendents, chief academic officers, curriculum directors, and coaches; and local actors such as principals, department heads, and parents or guardians. Communications to institutional decision-makers should aim to inform decision-making about whether and how to incorporate AI literacy into professional development and school curricula. Communications to parents and guardians should help them understand why it is important for their children or wards to learn about AI and its responsible use.

II. Replicate Day of AI Initiatives in Multiple Locales

Collaborate with networks of schools, school districts, professional educator associations, community partners, and corporate sponsors in receptive locales to establish local Day of AI initiatives. In each locale, work with local curriculum designers and educators to adapt the curricula for local contexts, language and culture, following the model of Day of AI Australia. Each adaptation should maximize feasibility of implementation within local constraints, include differentiated training and supports for teachers of varying background knowledge and skills (e.g., for teachers with a computer science background vs. those with no computer science training), and ensure congruence with local standards, integration with existing curricula, and cultural relevance.

III. Provide a Concise Overview for Instructors on the Content, Audience, and Sequencing for Day of AI Curricula

Create an overview webpage that concisely presents key information on each Day of AI curriculum to help educators choose easily from what is available, for example, using a format similar to Table 1 in this report. The information should include the name of the curriculum, the target age range of students, key concepts covered, the number of lessons or distinct units, and the amount of time needed to implement the curriculum. It would also be helpful to indicate on the website whether and when existing curricula will be updated to reflect new tools and developments in AI, and recommended sequencing of curricula for educators who will implement multiple curricula with the same students.

Additionally, for each of the Day of AI curricula, create a 1-page PDF summarizing the target audience, objectives, content, concepts addressed, and activities with time estimates, required preparation time/activities for the teacher, available resources, and equipment needed. While almost all of this information can be found on the existing web page and within the first few pages of the educator guide, several interviewees noted that it required some “digging” which is time-consuming and may not be worth the investment of time if it turns out a particular curriculum is not appropriate for their students. Ensure that information is consistent across all materials for each curriculum.

Notify educators via e-blast and different forms of social media when new curricula are available or a significant revision has been made. If registrants are willing to provide telephone numbers, consider a text messaging program and WhatsApp for registrants abroad.

IV. Plan for Ongoing Curriculum Updates, Revisions, and Adaptations

Given the rapid speed at which AI, its applications, and implications are developing, it will be important to review the curricula each year and to update them as needed to reflect new developments and tools. In addition, teachers will be seeking next steps for improving their students' AI literacy and looking for instructional materials that provide progression from year to year.

Curriculum revisions could be responsive to teacher requests to provide more opportunities for interaction with students through Q&A, quizzes, and integration of interactive tools such as Pear Deck and Curipod; to include more games or game-like activities and additional examples; and to offer assessments, more advanced content, and extensions including independent activities.

With the assistance of special education teachers, coaches, or curriculum developers, the Day of AI curricula could be adapted to better meet the needs of students with disabilities.

In collaboration with professional teacher educators, MIT RAISE could develop professional development modules to prepare teachers to teach about AI literacy and also how to use AI applications effectively to adapt, enhance, or streamline their instruction, student assessment, and administrative duties.

V. Increase Participation in Day of AI by More Closely Aligning with Schools' Existing Priorities

The Day of AI curricula might be easier to incorporate into the general curriculum by teachers from a variety of disciplines if the content were more aligned with subject area topics and any applicable standards, and if the tasks and activities were more related to typical school assignments.

To increase participation of schools serving students from lower income families, including Title I schools in the US, the curricula could be revised with a view to addressing basic literacy and math skills as well as AI literacy. This would allow these schools to meet accountability requirements for improving literacy and math while simultaneously introducing AI literacy.

The website, introductory video, and outreach materials could make it clearer that participating in the global Day of AI activities is optional for curriculum implementers. A number of interviewees and survey respondents noted that May 18, the date chosen for the global Day of AI in 2023, was either too late in the year or after school had already ended for them. MIT RAISE could consider organizing the global Day of AI earlier in the school year or on two separate dates so that more schools can participate.

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Appendix A. Countries and States in Which Day of AI Registrants Were Located[i]

Table A1. Frequency of Countries in Which Day of AI Registrants Were Located

Country	Number of registrants	% of registrants
United States of America	4932	64.59%
India	384	5.03%
Viet Nam	327	4.28%
Canada	248	3.25%
Spain	107	1.40%
China	106	1.39%
Mexico	95	1.24%
United Kingdom	76	1.00%
Australia	72	0.94%
Brazil	66	0.86%
South Korea	63	0.83%
United Arab Emirates	58	0.76%
Philippines	50	0.65%
Türkiye	43	0.56%
Hong Kong	42	0.55%
Colombia	41	0.54%
Argentina	39	0.51%
Bangladesh	33	0.43%
Germany	33	0.43%
Singapore	32	0.42%
Greece	31	0.41%
Japan	30	0.39%
Malaysia	30	0.39%
Nigeria	30	0.39%
Italy	29	0.38%
Indonesia	28	0.37%
Chile	27	0.35%
Republic of Korea	25	0.33%
Belgium	22	0.29%
Pakistan	22	0.29%
France	21	0.28%
Peru	20	0.26%
Portugal	19	0.25%
Switzerland	16	0.21%
Taiwan	16	0.21%
New Zealand	15	0.20%
Saudi Arabia	15	0.20%
South Africa	15	0.20%
Thailand	15	0.20%
Egypt	14	0.18%
Ghana	12	0.16%
Israel	12	0.16%
Romania	12	0.16%
Uruguay	12	0.16%
Lebanon	11	0.14%
Netherlands	11	0.14%
Sweden	11	0.14%
Ireland	10	0.13%

Country	Number of registrants	% of registrants
Morocco	10	0.13%
Hungary	9	0.12%
Tunisia	9	0.12%
Finland	8	0.10%
Poland	8	0.10%
Austria	7	0.09%
Ecuador	7	0.09%
Bulgaria	6	0.08%
Dominican Republic	6	0.08%
Kenya	6	0.08%
Nepal	6	0.08%
Afghanistan	5	0.07%
Bolivia	5	0.07%
Costa Rica	5	0.07%
Croatia	5	0.07%
Honduras	5	0.07%
Norway	5	0.07%
Panama	5	0.07%
Qatar	5	0.07%
Trinidad and Tobago	5	0.07%
Bahrain	4	0.05%
Czech Republic	4	0.05%
Ukraine	4	0.05%
Uzbekistan	4	0.05%
Venezuela	4	0.05%
Algeria	3	0.04%
Azerbaijan	3	0.04%
Cambodia	3	0.04%
Denmark	3	0.04%
Jamaica	3	0.04%
Jordan	3	0.04%
Lithuania	3	0.04%
Myanmar	3	0.04%
North Macedonia	3	0.04%
Serbia	3	0.04%
Slovakia	3	0.04%
Albania	2	0.03%
Armenia	2	0.03%
Bahamas (the)	2	0.03%
Bhutan	2	0.03%
Estonia	2	0.03%
Ethiopia	2	0.03%
Guatemala	2	0.03%
Iceland	2	0.03%
Kuwait	2	0.03%
Lesotho	2	0.03%
Luxembourg	2	0.03%
Mauritius	2	0.03%

Country	Number of registrants	% of registrants
Montenegro	2	0.03%
Oman	2	0.03%
Slovenia	2	0.03%
Sri Lanka	2	0.03%
Uganda	2	0.03%
Belarus	1	0.01%
Belize	1	0.01%
Benin	1	0.01%
Bosnia & Herzegovina	1	0.01%
Brunei Darussalam	1	0.01%
Burundi	1	0.01%
El Salvador	1	0.01%
Eswatini	1	0.01%
Guam	1	0.01%
Ivory Coast	1	0.01%
Kazakhstan	1	0.01%
Kosovo	1	0.01%
Kyrgyzstan	1	0.01%
Latvia	1	0.01%
Malawi	1	0.01%
Malta	1	0.01%
Marshall Islands (the)	1	0.01%
Mozambique	1	0.01%
Namibia	1	0.01%
Nicaragua	1	0.01%
Paraguay	1	0.01%
Puerto Rico	1	0.01%
Saint Kitts and Nevis	1	0.01%
Samoa	1	0.01%
Scotland	1	0.01%
Tajikistan	1	0.01%
Timor-Leste	1	0.01%
Tonga	1	0.01%
Yemen	1	0.01%
Zambia	1	0.01%
Zimbabwe	1	0.01%
Not specified/sanctioned	13	0.17%
Total	7,636	

Note: The table includes countries indicated by individuals registering between 2/1/2023 and 8/13/2023.

Table A2. US States/Territories in Which Registrants Were Located

State/territory	Number of registrants in this state/territory	% of US-based registrants located in this state/territory
Texas	540	10.95%
New York	500	10.14%
California	480	9.73%
Massachusetts	359	7.28%
Pennsylvania	226	4.58%
Illinois	184	3.73%
New Jersey	160	3.24%
Michigan	154	3.12%
Florida	151	3.06%
Virginia	144	2.92%
Georgia	142	2.88%
Washington	142	2.88%
North Carolina	111	2.25%
Ohio	102	2.07%
Connecticut	98	1.99%
Maryland	95	1.93%
Arizona	86	1.74%
Wisconsin	83	1.68%
Colorado	74	1.50%
Iowa	65	1.32%
Minnesota	52	1.05%
South Carolina	51	1.03%
Missouri	46	0.93%
Indiana	44	0.89%
Alabama	42	0.85%
New Mexico	42	0.85%
Maine	41	0.83%
Kentucky	39	0.79%
Kansas	37	0.75%
Oregon	36	0.73%
Nebraska	32	0.65%
Oklahoma	32	0.65%
Tennessee	32	0.65%
Hawaii	31	0.63%
Louisiana	29	0.59%
Nevada	28	0.57%

State/territory	Number of registrants in this state	% of US-based registrants located in this state
New Hampshire	27	0.55%
Arkansas	20	0.41%
DC	16	0.32%
Utah	14	0.28%
Vermont	14	0.28%
Delaware	13	0.26%
Idaho	12	0.24%
Rhode Island	12	0.24%
Puerto Rico	9	0.18%
Mississippi	8	0.16%
Alaska	5	0.10%
Montana	5	0.10%
West Virginia	4	0.08%
North Dakota	3	0.06%
South Dakota	3	0.06%
U.S. Armed Forces	1	0.02%
Virgin Islands	1	0.02%
Wyoming	1	0.02%
Blank	70	1.42%
Not specified	184	3.73%
Total	4,932	

[i] A review of the registration data suggests that some registrants were not careful about providing accurate location data, for example, providing a city and state in the US but selecting a foreign country, or naming a foreign city and country but selecting a US state. For example, 82 registrants claimed to be located in Afghanistan but 77 of these simultaneously claimed to be in a US city and state. It is likely they simply selected the first country in an alphabetically-ordered dropdown list in the registration form. Some respondents appear to have selected United Arab Emirates instead of United States of America and vice versa based on the remainder of the address provided. The data were sorted by country and state, and obvious errors corrected. However, without IP addresses, it would be prohibitively time-consuming to verify all the location data. Consequently, while the country and state data are reported here, full accuracy cannot be guaranteed. Going forward, the registration system could be redesigned such that users do not need to register multiple times to receive different newsletters. Future registration forms should be designed to reduce entry errors, for example, asking for country selection from a dropdown list first and only offering relevant state/territory selections for that country. Alternatively, using a Qualtrics survey to collect registration information would allow for IP addresses to be collected automatically. An IP lookup tool could then be used to accurately identify the country, state, and, if desired, city for each respondent.