THE EDTECH COLLECTIVE
Instructure Partner Ecosystem

QUANTHUB UPSKILL

ESSA Level III Brief (December–July, 2025)

Andrew Scanlan, M.A., Senior Researcher
Meetal Shah, Ph.D., Lead Researcher

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Key Findings	
Descriptive	
+	**Students responded more positively to all survey questions across all skill domains after using the *QuantHub Upskill* platform**, including college and career plans; engagement with data science; value and relevance of data literacy in everyday life; and familiarity with specific data literacy tools and skills.
Correlative[1]	
+	Students who mastered more skills on the *QuantHub Upskill* platform **were significantly more likely to react positively** to the statement: **"I am interested in learning data analysis."**
+	Students who mastered more skills on the *QuantHub Upskill* platform **were significantly more likely to react positively** to the statement **"Data literacy is useful to the typical professional."**
+	Students who mastered more skills on the *QuantHub Upskill* platform **were significantly more likely to indicate familiarity** with **"Machine learning, large language models (LLMs), and neural networks."**
+	Students who mastered more skills on the *QuantHub Upskill* platform **were significantly more likely to indicate familiarity** with **"Algorithms and how they work."**

[1] Statistical significance means the result is unlikely to be due to chance. In correlative analyses (especially with important statistical controls), it means that a relationship between an intervention and outcome is unlikely to be random–and may be attributable to the intervention itself.

INTRODUCTION

Between June 9 and July 31, 2025, students participated in QuantHub's Alabama Data Scholars Internship Program, an eight-week internship and upskilling initiative (funded in part by a state-awarded Innovate Alabama grant) designed to engage and prepare the state's next generation of data- and artificial intelligence (AI)-driven innovators. The program combined career exploration, skill building, and college readiness. Students advanced skills in areas such as data visualization, statistical analysis, decision-making, and ethical AI. Hands-on workshops covered Structured Query Language (SQL), Python, prompt engineering, generative AI, and other related skills. Themed skill paths and enrichment activities complemented internship projects while industry professionals and faculty from Alabama colleges and universities provided mentorship and guidance. Students committed 10 hours per week to internship assignments and 5–10 additional hours to skills training and enrichment. Internships were offered in on-site, hybrid, and virtual formats, with the option to complete the program entirely online. Students were provided with a $1,200 stipend.

QuantHub Upskill is an educational platform that builds data literacy and analytical skills for students in grades 6–12 and higher education. Before and during QuantHub's Alabama Data Scholars Internship Program, and in alignment with internship goals, students were given access to the *QuantHub Upskill* platform. Students began using *QuantHub Upskill* during their application process for the internship, starting as early as December 2024 and continuing through July 31, 2025. QuantHub contracted with Instructure to examine the relationship between usage of the platform and improvements in students' reported feelings about college and career plans; engagement with data science; value and relevance of data literacy in everyday life; and familiarity with specific data literacy tools and skills. Instructure previously designed a logic model (Appendix A) and Level IV (Demonstrates Rationale) report (Scanlan & Hunt, 2024), aligned to the Every Student Succeeds Act (ESSA, 2015). Using the ESSA standards as guidance in developing a study design, findings in this report align with ESSA Level III (Promising Evidence) (see Appendix B).

RESEARCH QUESTIONS

Implementation

1. To what extent did students use the *QuantHub Upskill* platform between December 2024 and July 2025?
    a. How many weeks and minutes did students spend using the platform?
    b. What was the average number of questions that students answered?
    c. What was the average number of skills that students mastered?
    d. What was the average number of certificates that students earned?
    e. What was the average number of neurons that students earned?

Student outcomes

2. How did students' reported feelings about each of the following skill domains change between December 2024 and July 2025:
    a. College and career plans;
    b. Engagement with data science;
    c. Recognition of the value and relevance of data literacy in everyday life; and
    d. Familiarity with specific data literacy tools and skills?
3. To what extent did the number of skills mastered on *QuantHub Upskill* relate to their survey responses for each skill domain?

STUDY DESIGN AND METHODS

This correlational study examined how use of the *QuantHub Upskill* platform before and during QuantHub's Alabama Data Scholars Internship Program related to students' answers on a custom survey instrument that asked them about their college and career plans; their engagement with data science; their feelings about the value and relevance of data literacy in everyday life; and their familiarity with specific data literacy tools and skills.

Sample

The study sample included 41 students. QuantHub provided demographic data for each participant, including education level (high school versus undergraduate status), school, gender, race, and ethnicity. Eighty-three percent of students were in high school and 17% were completing an undergraduate degree. Forty-eight percent identified as male, 46% as female, and 5% were unspecified. Thirty-four percent of students were Black or African American, 27% were White, and 23% were Asian. An additional 16% were African, Biracial or Multiracial, preferred not to say, or unspecified. 85% were not Hispanic or Latino and 15% were Hispanic or Latino, preferred not to say, or were unspecified.

Usage data

QuantHub also provided platform usage metrics including the number of active weeks on the platform; total minutes on the platform; number of questions answered; number of neurons earned;[2] number of skills mastered, and number of certificates earned. For outcomes analyses, the primary usage metric used was the number of skills mastered. Only students with at least one recorded skill mastered were included in correlative analyses.

Survey design and outcomes

As an outcome metric, researchers constructed a custom survey instrument using items adapted from widely used, standardized instruments:

- *Student Efficacy and Attitudes toward STEM (S-STEM) Survey*: Selected items were adapted to measure students' intrinsic motivation and self-efficacy in math- and science-related topics (Friday Institute for Educational Innovation, 2012).
- *Survey of Attitudes Toward Statistics (SATS)*: Questions adapted from this survey measured students' perceptions of their own data literacy and comfort with data-related concepts (Schau et al., 1995).
- *Panorama Employability Skills Survey*: Items adapted from this survey measured readiness for college, career, and life. Domains included growth mindset, self-management, social awareness, and self-efficacy (Panorama Education, 2024).

The survey was administered once to students between July 15 and July 31, 2025, and students were asked to retrospectively rate their perceptions both before and after using the *QuantHub Upskill* platform during the study period. A retrospective survey design is a methodological approach that can sometimes be beneficial when compared with a pretest/postest design. Respondents can overestimate their knowledge on traditional pretests because they 'don't know what they don't know,' and after the intervention, retrospective pre-ratings may provide a more accurate baseline (Geldhof et al., 2018). This design may also be less burdensome for participants than administering two surveys close together (Young & Kallemeyn, 2019) and was especially practical in this study's internship context, where a pre-survey was difficult to implement in a

[2] "Neurons" are awarded for correct or partially correct answers with harder questions yielding more points. Learners tracked their totals through dashboards and leaderboards.

short timeframe. However, retrospective designs can introduce recall bias (e.g., forgetting or misrepresenting their actual feelings pre-intervention), social desirability bias (e.g., overestimating progress for an external audience) or anchoring bias (e.g. respondents presume they 'should' show improvement) (Geldhof et al., 2018). (See the Limitations section for more information.)

Responses were securely collected via the Qualtrics platform and were recorded using Likert scale responses. The final survey instrument included the following number of questions across each of the skill domains shown:

- 7 questions on college and career plans;
- 4 questions on engagement with data science;
- 9 questions on the value and relevance of data literacy in everyday life; and
- 11 questions on familiarity with specific data literacy tools and skills.

Analytic Approach

To examine implementation, descriptive statistics were calculated for all usage metrics (see Appendix C for more information). To analyze associations between the number of skills mastered on the *QuantHub Upskill* platform and outcomes, researchers conducted partial correlation analyses, controlling for students' pre-survey ratings (their retrospective 'before' scores). Students' post-survey ratings ('after' scores) served as the outcomes of interest.[3] More information on correlative findings can be found in Appendix D.

[3] Partial correlation analyses included only the pre-survey scores as a covariate since other potential controls were nonsignificant predictors of change in post-survey scores and the small analytic samples (around 20–30 for each set of questions) made additional predictors statistically unreliable.

IMPLEMENTATION FINDINGS

1

To what extent did students use the *QuantHub Upskill* platform between December 2024 and July 2025?

a) How many weeks and minutes did students spend using the platform?
b) What was the average number of questions that students answered?
c) What was the average number of skills that students mastered?
d) What was the average number of certificates that students earned?
e) What was the average number of neurons that students earned?

Students answered questions on *QuantHub Upskill* through adaptive assessments designed to test proficiency across a range of data skills, including data science, data engineering, and data literacy. Question formats varied (e.g., ordering, short answer, fill-in-the-blank) and were dynamically selected based on prior responses to adjust difficulty in real time. Each question mapped to QuantHub's defined competencies, organized in a skills catalog spanning areas such as statistics, SQL, machine learning, and data ethics, which provided specific benchmarks for data and AI roles.

On average, students spent three weeks and 178 minutes on the platform, completing 281 adaptive questions that calibrated in difficulty to build a detailed skill profile. Students mastered an average of 11 skills, each requiring successful completion of multiple questions (the number varies for each skill). On average, they also earned one certificate (a credential awarded for completing a defined set of skills).

In addition, on average, students earned 6,330 'neurons' (QuantHub's gamified points system). Neurons are awarded for correct or partially correct answers with harder questions yielding more points. Learners tracked their totals through dashboards and leaderboards, using neurons to monitor progress and stay motivated (Table 1).

Table 1. Average *QuantHub Upskill* use by usage metric

***QuantHub Upskill* Usage Metrics**	**Total Sample (*n*=41)**	**Standard Deviation**	**Range**
Number of active weeks on the platform	3	2	1–9
Number of minutes on the platform	178	211	0–924
Number of questions answered	281	266	1–1,081
Number of skills mastered	11	10	0–36
Number of neurons earned	6,330	6,037	0–24,517
Number of certificates earned	1	2	0–6

DESCRIPTIVE OUTCOME FINDINGS

2

How did students' reported feelings about each of the following skill domains change between December 2024 and July 2025:

1. College and career plans;
2. Engagement with data science;
3. Recognition of the value and relevance of data literacy in everyday life; and
4. Familiarity with specific data literacy tools and skills?

A subset of students completed a custom survey using questions adapted from the S-STEM, SATS, and Panorama Employability Skills surveys, to examine how *QuantHub Upskill* usage related to the outcomes in each skill domain. Descriptive results are shown in Figures 1–4 and illustrate changes in mean survey scores (1.00 = less positive, 5.00 = more positive) from 'before' to 'after' responses. Because some students did not complete the full survey, sample sizes vary slightly across domains.

College and career plans

Respondents were asked to rate their feelings on a five-point Likert scale scored as follows: 1.00 = Strongly Disagree; 2.00 = Disagree; 3.00 = Neither Agree nor Disagree; 4.00 = Agree; and 5.00 = Strongly Agree. Descriptive results, shown in Figure 1, indicate that students (*n* = 31) reported positive changes in reported feelings about their college and career plans, particularly in their awareness of data-focused careers in data science, analytics, and AI.

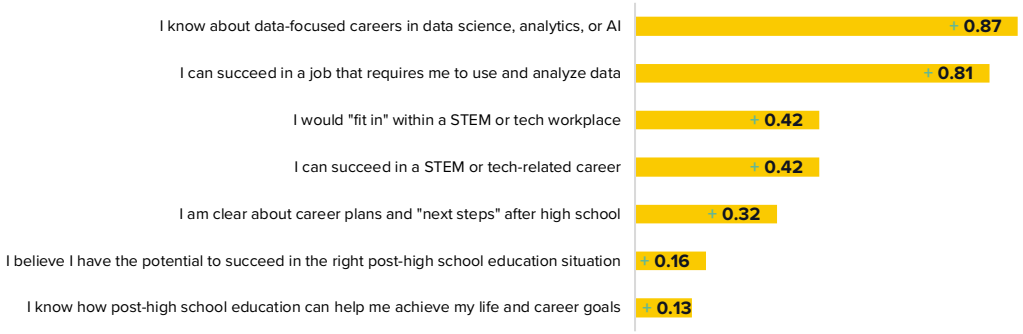

Figure 1. Descriptive changes in 'before' and 'after' mean scores for student responses about their college and career plans

Engagement with data science

Respondents were asked to rate their feelings on a five-point Likert scale scored as follows: 1.00 = Strongly Disagree; 2.00 = Disagree; 3.00 = Neither Agree nor Disagree; 4.00 = Agree; and 5.00 = Strongly Agree. Descriptive results, shown in Figure 2, indicate that students (*n* = 26) reported positive changes in reported feelings about their engagement with data science, particularly in their interest and confidence in communicating data insights to others.

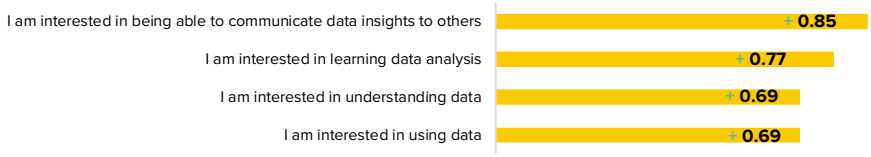

Figure 2. Descriptive changes in 'before' and 'after' mean scores for student responses about their engagement with data science

Recognition of the value and relevance of data literacy in everyday life

Respondents were asked to rate their feelings on a five-point Likert scale scored as follows: 1.00 = Strongly Disagree; 2.00 = Disagree; 3.00 = Neither Agree nor Disagree; 4.00 = Agree; and 5.00 = Strongly Agree. Descriptive results, shown in Figure 3, indicate that students (*n* = 25) reported positive changes in reported feelings about recognizing the relevance of data literacy in everyday life, particularly in their ability to use data in daily contexts, but also in their belief that data literacy should be a required component of professional training. Note that while some survey items were phrased negatively, researchers coded responses such that the changes reported below are reflective of more positive responses.

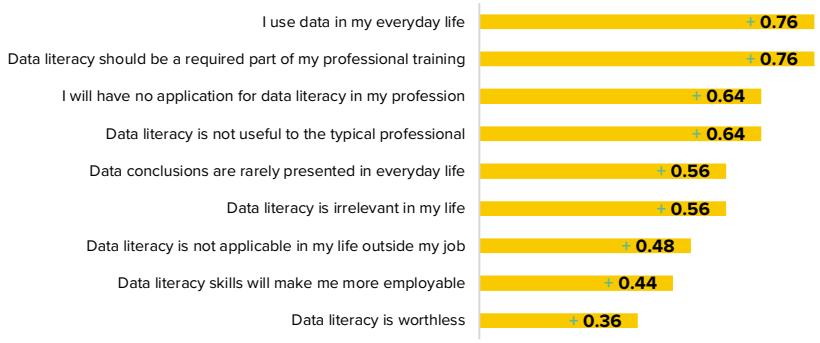

Figure 3. Descriptive changes in 'before' and 'after' mean scores for student responses about them recognizing the value and relevance of data literacy in everyday life

Familiarity with specific data literacy tools and skills

Respondents were asked to rate their feelings on a six-point Likert scale scored as follows: 0.00 = N/A or Does Not Apply (if they were not exposed to the tool or skill); 1.00 = Not at All Familiar; 2.00 = Slightly Familiar; 3.00 = Moderately Familiar; 4.00 = Very Familiar; and 5.00 = Extremely Familiar. Descriptive results, shown in Figure 4, indicate that students (*n* = 25) reported the greatest positive changes in reported feelings about their familiarity with data reporting, data analysis and interpretation, data cleaning and preparation, and data visualization.

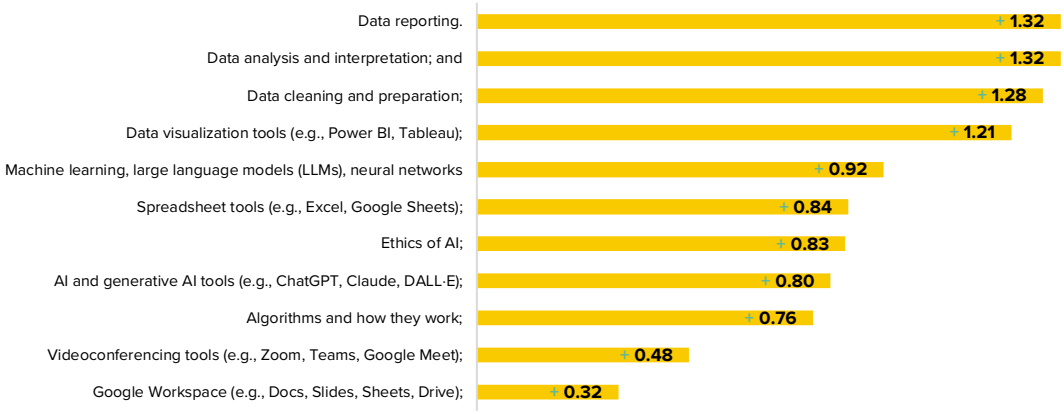

Figure 4. Descriptive changes in 'before' and 'after' mean scores for student responses about their familiarity with specific data literacy tools and skills

CORRELATIVE OUTCOME FINDINGS

3

To what extent did the number of skills mastered on *QuantHub Upskill* relate to their survey responses for each skill domain?

College and career plans

The number of skills mastered on the platform was not significantly related, positively or negatively, to the following statements (Figure 5):

- I know how post-high school education can help me achieve my life and career goals;
- I believe I have the potential to succeed in the right post-high school education situation;
- I am clear about career plans and "next steps" after high school;
- I know about data-focused careers in data science, analytics, or AI;
- I can succeed in a job that requires me to use and analyze data
- I can succeed in a STEM or tech-related career; and
- I would "fit in" within a STEM or tech workplace.

The number of skills mastered on the *QuantHub Upskill* platform was not significantly related to their college and career plans

Figure 5. Partial correlations between the number of skills mastered on *QuantHub Upskill* and survey answers about students' college and career plans

Engagement with data science

Students who mastered more skills on the *QuantHub Upskill* platform were more likely to answer positively to the statement "I am interested in learning data analysis" ($r = 0.43$; $p = .018$). The number of skills mastered on the platform was not significantly related, negatively or positively, to the following statements (Figure 6):

- I am interested in being able to communicate data insights to others;
- I am interested in using data; and
- I am interested in understanding data.

Students who mastered more skills on the *QuantHub Upskill* platform were significantly more likely to answer positively to the statement: "I am interested in learning data analysis"

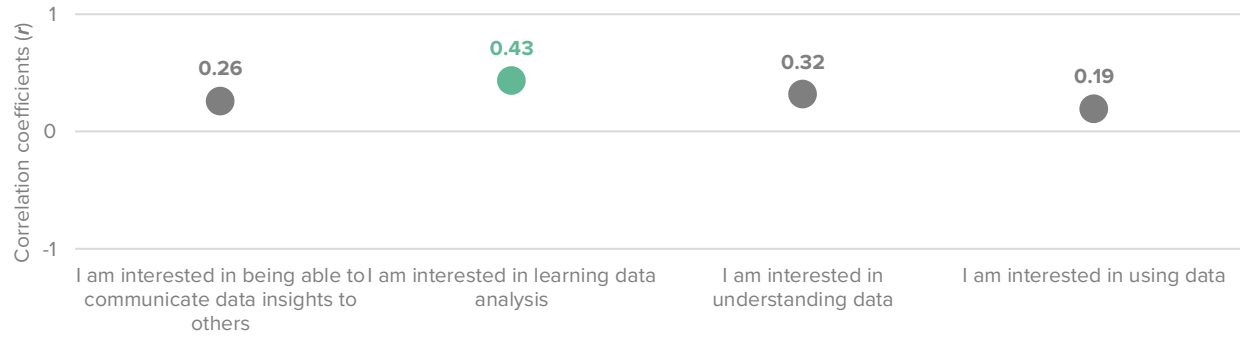

Figure 6. Partial correlations between the number of skills mastered on *QuantHub Upskill* and survey answers about students' engagement with data science

Recognition of the value and relevance of data literacy in everyday life[4]

Students who mastered more skills on the *QuantHub Upskill* platform were more likely to react positively to the following statement "Data literacy is not useful to the typical professional" (i.e., they reacted more positively about the value of data literacy) (r = 0.42; p = .025). The number of skills mastered on the platform was not significantly related, negatively or positively, to the following statements (Figure 7):

- Data literacy is worthless;
- Data literacy should be a required part of my professional training;
- Data literacy skills will make me more employable;
- Data literacy is not applicable in my life outside my job;
- I use data in my everyday life;
- Data conclusions are rarely presented in everyday life;
- I will have no application for data literacy in my profession; and
- Data literacy is irrelevant in my life.

Students who mastered more skills on the *QuantHub Upskill* platform were significantly more likely to react positively to the statement "Data literacy is useful to the typical professional"

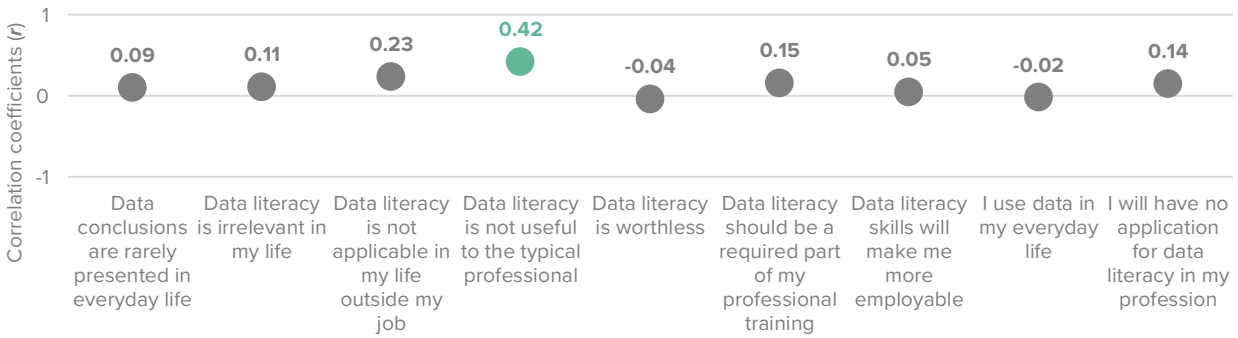

Figure 7. Partial correlations between the number of skills mastered on *QuantHub Upskill* and survey answers about students recognizing the value and relevance of data literacy in everyday life?

[4] Some survey items were presented in a negatively coded format. During data cleaning, responses were recoded so that more supportive or positive replies corresponded to higher values on the scale, and less supportive replies corresponded to lower values.

Familiarity with specific data literacy tools and skills

Students who mastered more skills on the *QuantHub Upskill* platform were more likely to indicate familiarity with "Machine learning, large language models (LLMs), and neural networks" (r = 0.40; p = .030) and "Algorithms and how they work" (r = 0.38; p = .044). The number of skills mastered on the platform was not significantly related, negatively or positively, to their familiarity with the following tools and skills (Figure 8):

- AI and generative AI tools (e.g., ChatGPT, Claude, DALL·E);
- Ethics of AI;
- Spreadsheet tools (e.g., Excel, Google Sheets);
- Data visualization tools (e.g., Power BI, Tableau);
- Google Workspace (e.g., Docs, Slides, Sheets, Drive);
- Videoconferencing tools (e.g., Zoom, Teams, Google Meet);
- Data cleaning and preparation;
- Data analysis and interpretation; and
- Data reporting.

Students who mastered more skills on the *QuantHub Upskill* platform were significantly more likely to indicate familiarity with "Machine learning, large language models (LLMs), and neural networks" and "Algorithms and how they work"

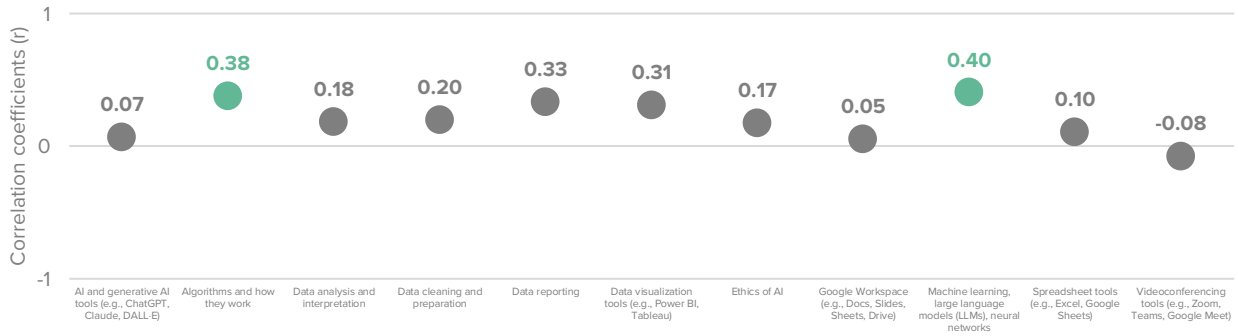

Figure 8. Partial correlations between the number of skills mastered on *QuantHub Upskill* and survey answers about their familiarity with specific data literacy tools and skills

CONCLUSIONS

Students in QuantHub's Alabama Data Scholars Internship Program used the *QuantHub Upskill* platform consistently between December 2024 and July 2025. Descriptive survey results showed positive changes in all questions across all skill domains examined, including college and career plans, engagement with data science, recognition of the value of data literacy in everyday life, and familiarity with specific data literacy tools and skills.

Correlational analyses revealed several statistically significant associations between the number of skills mastered and specific student outcomes. Students who answered more questions were more likely to express interest in learning data analysis, to endorse the idea that data literacy is useful for typical professionals, and to report familiarity with machine learning concepts, large language models, neural networks, and algorithms. At the same time, the number of skills mastered was not significantly related to other survey items.

Taken together, these findings suggest that *QuantHub Upskill* shows promise as a tool for supporting student engagement with data literacy and career readiness. This study meets ESSA

evidence requirements for Level III (Promising Evidence) by demonstrating statistically significant, positive correlations between *QuantHub Upskill* usage and selected student outcomes. Specifically, this study met the following criteria:

- Correlational study
- Proper design and implementation
- Statistical controls through covariates
- At least one statistically significant, positive correlation with statistical controls for selection bias

LIMITATIONS AND FUTURE RESEARCH

The current study offers promising results about the influence of *QuantHub Upskill* that should be explored and replicated with continued studies. Researchers could address current study limitations in future research efforts, as outlined below:

- *Sample size*. The study involved a relatively small group of students, reflecting the real-world constraints and scope of QuantHub's Alabama Data Scholars Internship Program. More studies in diverse contexts may reinforce this study's findings and a collection of findings across multiple studies may allow them to be more generalizable.
- *Survey design*. Outcomes relied on retrospective pre-survey ratings, where students reflected on how they felt before the program at a single point in time. This approach helps minimize survey burden but could be less reliable than collecting baseline data before program exposure. For example, retrospective designs can introduce "response-shift bias" when participants' learning or experiences during a program change how they understand and interpret questionnaire items, causing their pretest and posttest responses to reflect different frames of reference rather than true change (Geldhof et al., 2018). Collecting survey responses at two timepoints (at the beginning and end of implementation) could provide more accurate evidence of what participants felt before the intervention as well as change over time.
- *Lack of comparison group.* All participants used the *QuantHub Upskill* platform, meaning there was no opportunity to compare outcomes with non-users. As a result, the study cannot determine whether the platform caused improvements relative to other programs or standard practice. Future work should employ an ESSA Level II–aligned quasi-experimental design with a demographically similar comparison group.
- *Context of implementation*. Results come from students attending a single state summer program. Additional studies in different contexts—such as full academic-year courses, internships, or other state and district initiatives—would help determine whether findings generalize across settings.
- *Short timeframe*. Students only used *QuantHub Upskill* from December to July. This limited duration provides insight into short-term changes but does not capture whether outcomes persist or grow over time.

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APPENDIX A: ESSA TIERS

The Every Student Succeeds Act (ESSA, 2015) provides schools and districts with a framework for determining which products are evidence-based and have been shown to improve student or other relevant outcomes. Following guidance from ESSA (statute and non-regulatory guidance), Education Department General Administrative Regulations (EDGAR), Standards for Excellence in Education Research (SEER) and What Works Clearinghouse (WWC, 2022), Instructure classifies the research of interventions into one of the four ESSA evidence levels. For more information regarding the evidence levels, please visit https://www.instructure.com/resources/product-overviews/ensure-edtech-efficacy-essa-evidence.

 **ESSA Level IV** **Demonstrates Rationale**	 **ESSA Level III** **Promising Evidence**	 **ESSA Level II** **Moderate Evidence**	 **ESSA Level I** **Strong Evidence**
Research-based logic model (theory of change) for why this product should work **Blueprint for implementation** with fidelity, including appropriate usage metrics to track Represents a rationale – **not empirical research** – in an authentic education setting **Limitations** on federal funding eligibility	**Correlational research study** showing positive relationship between tool use and student outcomes Study **did not include comparison groups**, random assignment, or baseline equivalence Most meaningful for districts with **similar context** (student demographics, etc.) Establishes **eligibility for all types** of federal funding	**Quasi-experimental research study** showing students who used the product outperformed students who did not Includes **demographically similar comparison group**, but groups were not randomly assigned District **context should be strongly considered** when interpreting results Establishes **eligibility for all types** of federal funding	**Experimental research study** proving students who used the product outperformed students who did not Utilizes **randomized comparison group** for very strong, highly generalizable evidence Establishes **eligibility for all types** of federal funding

APPENDIX B: LOGIC MODEL

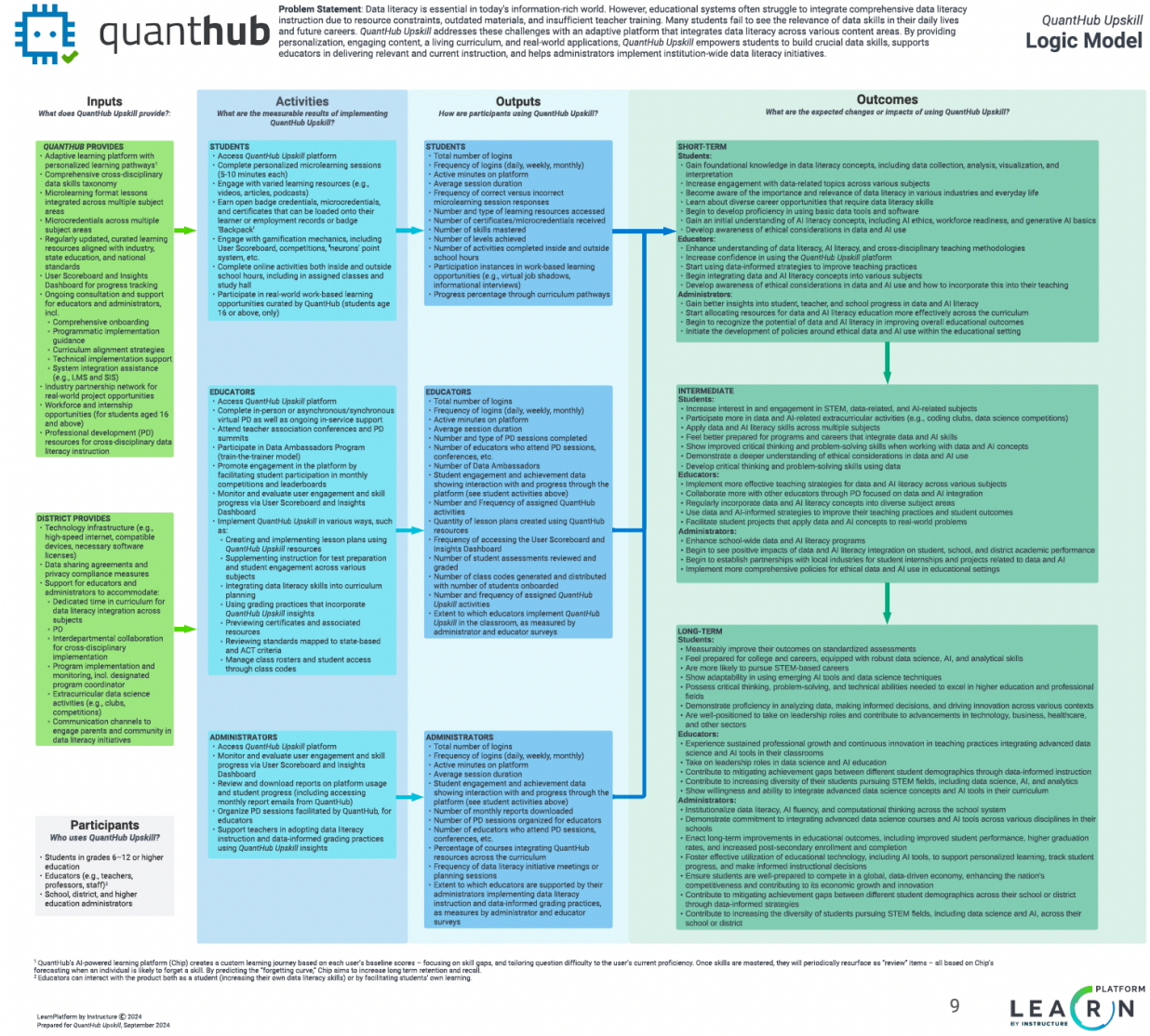

Figure A1. *QuantHub Upskill* logic model (Scanlan & Hunt, 2024)

APPENDIX C: ADDITIONAL INFORMATION ON DESCRIPTIVE OUTCOMES

The following section shows the descriptive mean survey scores for each question in each skill domain. These findings are descriptive, only, and do no indicate correlation or causal inference.

Table C1: Descriptive mean scores by survey question for 'college and career plans' skill domain

College and career paths (*n* = 31)	Before using *QuantHub Upskill*	After using QuantHub *Upskill*	Change
I am clear about career plans and "next steps" after high school	3.87	4.19	0.32
I believe I have the potential to succeed in the right post-high school education situation	4.52	4.68	0.16
I can succeed in a job that requires me to use and analyze data	3.61	4.42	0.81
I can succeed in a STEM or tech-related career	4.16	4.58	0.42
I know about data-focused careers in data science, analytics, or AI	3.42	4.29	0.87
I know how post-high school education can help me achieve my life and career goals	4.48	4.61	0.13
I would "fit in" within a STEM or tech workplace	3.90	4.32	0.42

Table C2: Descriptive mean scores by survey question for 'engagement with data science' skill domain

Engagement with data science (*n* = 26)	Before using *QuantHub Upskill*	After using QuantHub *Upskill*	Change
I am interested in being able to communicate data insights to others	3.46	4.31	0.85
I am interested in learning data analysis	3.77	4.54	0.77
I am interested in understanding data	3.88	4.58	0.69
I am interested in using data	3.77	4.46	0.69

Table C3: Descriptive mean scores by survey question for the 'recognition of the value and relevance of data literacy in everyday life' skill domain

Recognition of the value and relevant of data literacy in everyday life (*n* = 25)	Before using *QuantHub Upskill*	After using QuantHub *Upskill*	Change
Data conclusions are rarely presented in everyday life	3.32	3.88	0.56
Data literacy is irrelevant in my life	4.08	4.64	0.56
Data literacy is not applicable in my life outside my job	3.56	4.04	0.48
Data literacy is not useful to the typical professional	3.80	4.44	0.64
Data literacy is worthless	4.48	4.84	0.36
Data literacy should be a required part of my professional training	3.48	4.24	0.76
Data literacy skills will make me more employable	4.16	4.60	0.44
I use data in my everyday life	3.60	4.36	0.76
I will have no application for data literacy in my profession	3.80	4.44	0.64

Note, while some survey items were phrased negatively, researchers coded responses such that the changes reported above are reflective of more positive responses.

Table C4: Descriptive mean scores by survey question for the 'familiarity with specific data literacy tools and skills' domain

Familiarity with specific data literacy tools and skills (*n* = 25)	Before using *QuantHub Upskill*	After using QuantHub *Upskill*	Change
AI and generative AI tools (e.g., ChatGPT, Claude, DALL·E);	3.52	4.32	0.80
Algorithms and how they work;	2.88	3.64	0.76
Data analysis and interpretation; and	2.60	3.92	1.32
Data cleaning and preparation;	2.40	3.68	1.28
Data reporting.	2.28	3.60	1.32
Data visualization tools (e.g., Power BI, Tableau);	2.25	3.46	1.21
Ethics of AI;	2.96	3.79	0.83
Google Workspace (e.g., Docs, Slides, Sheets, Drive);	4.24	4.56	0.32
Machine learning, large language models (LLMs), neural networks	2.80	3.72	0.92

APPENDIX D: ADDITIONAL INFORMATION ON CORRELATIVE OUTCOMES

The following section shows the full correlation coefficients from partial correlation analyses between the number of skills mastered on *QuantHub Upskill* and survey answers for each skill domain. Statical significance is reported at the $p < 0.05$ level and marked in **green**.

Table D1: Partial correlations between the numbers of skills mastered on *QuantHub Upskill* and survey answers for the 'college and career plans' skill domain

College and career paths (*n* = 31)	Correlation Coefficients (*r*)	*p*-value
I am clear about career plans and "next steps" after high school	-0.17	.366
I believe I have the potential to succeed in the right post-high school education situation	-0.04	.841
I can succeed in a job that requires me to use and analyze data	0.35	.057
I can succeed in a STEM or tech-related career	-0.09	.654
I know about data-focused careers in data science, analytics, or AI	0.19	.315
I know how post-high school education can help me achieve my life and career goals	0.04	.831
I would "fit in" within a STEM or tech workplace	-0.14	.460

Table D2. Partial correlations between numbers of skills mastered on *QuantHub Upskill* and survey answers for the 'engagement with data science' skill domain

Engagement with data science (*n* = 26)	Correlation Coefficients (*r*)	*p*-value
I am interested in being able to communicate data insights to others	0.26	.172
I am interested in learning data analysis	0.43	**.018**
I am interested in understanding data	0.32	.090
I am interested in using data	0.19	.315

Table D3. Partial correlations numbers of skills mastered on *QuantHub Upskill* and answers for the 'recognition of the value and relevant of data literacy in everyday life' skill domain

Recognition of the value and relevant of data literacy in everyday life (*n* = 25)	Correlation Coefficients (*r*)	*p*-value
Data conclusions are rarely presented in everyday life	0.09	.626
Data literacy is irrelevant in my life	0.11	.573
Data literacy is not applicable in my life outside my job	0.23	.229
Data literacy is not useful to the typical professional	0.42	**.025**
Data literacy is worthless	-0.04	.822
Data literacy should be a required part of my professional training	0.15	.440
Data literacy skills will make me more employable	0.05	.816
I use data in my everyday life	-0.02	.914
I will have no application for data literacy in my profession	0.14	.455

Note, while some survey items were phrased negatively, researchers coded responses such that the changes reported above are reflective of more positive responses

Table D4: Partial correlations numbers of skills mastered on *QuantHub Upskill* and survey answers for the 'familiarity with specific data literacy tools and skills' domain

Familiarity with specific data literacy tools and skills (*n* = 25)	Correlation Coefficients (*r*)	*p*-value
AI and generative AI tools (e.g., ChatGPT, Claude, DALL·E)	0.07	.736
Algorithms and how they work	0.38	**.044**
Data analysis and interpretation	0.18	.345
Data cleaning and preparation	0.20	.302
Data reporting	0.33	.078
Data visualization tools (e.g., Power BI, Tableau)	0.31	.110
Ethics of AI	0.17	.379
Google Workspace (e.g., Docs, Slides, Sheets, Drive)	0.05	.785
Machine learning, large language models (LLMs), neural networks	0.40	**.030**
Spreadsheet tools (e.g., Excel, Google Sheets)	0.10	.590
Videoconferencing tools (e.g., Zoom, Teams, Google Meet)	-0.08	.691