

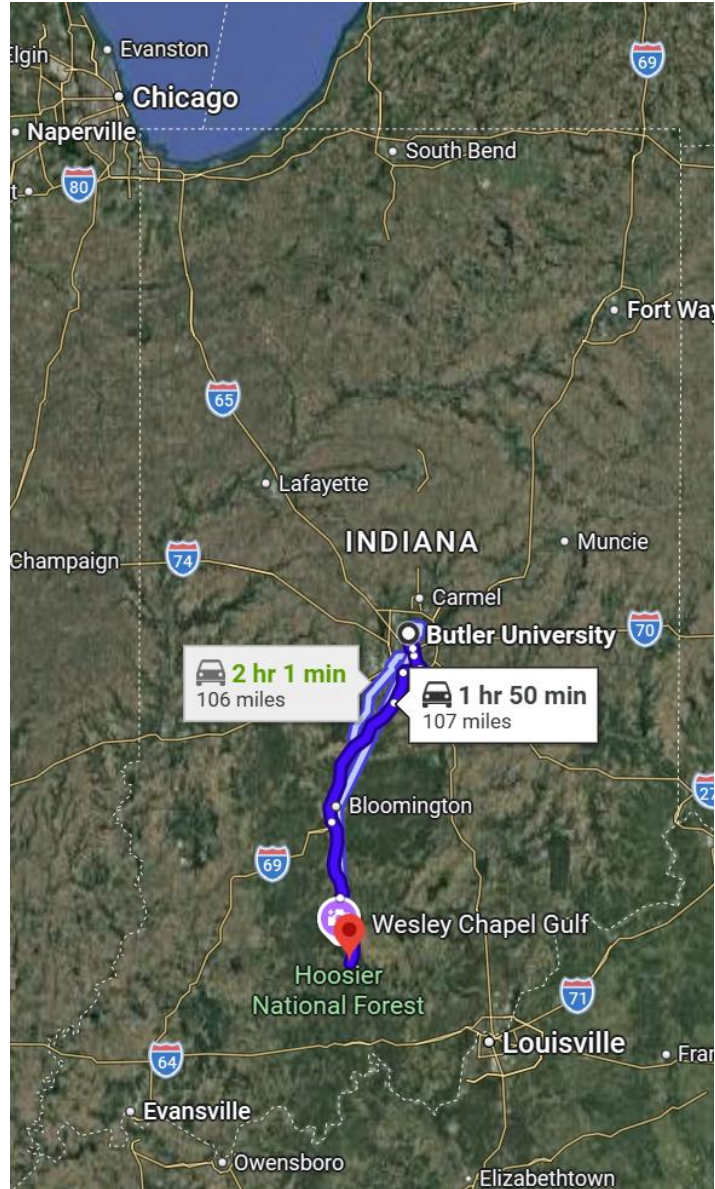
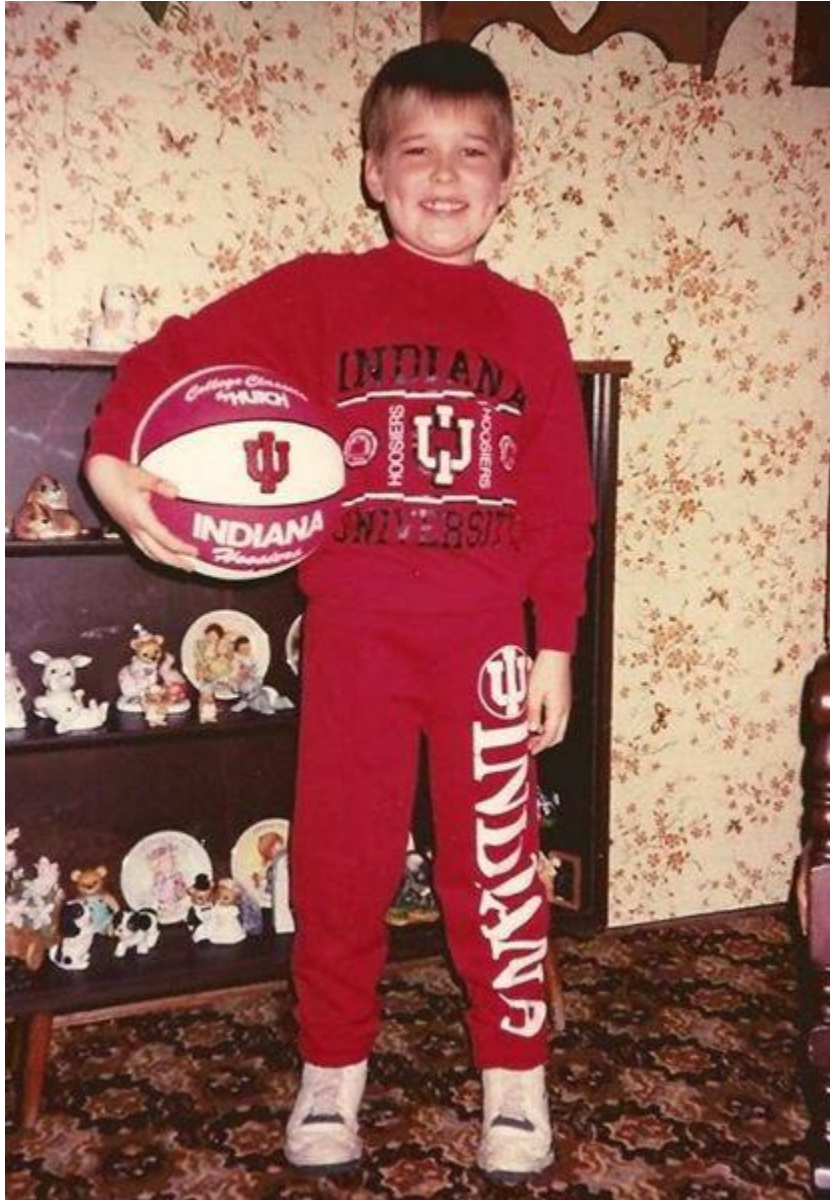
Data4Good: A Ministry of Stewardship

BUTLER

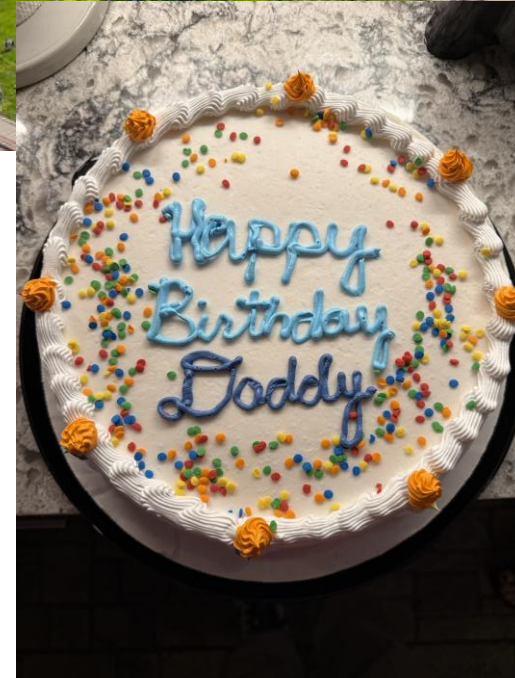


Matthew A. Lanham, Ph.D., CAP-X, ACE
Assistant Professor of Business Technology & Analytics
Butler University Lacy School of Business
mlanham1@butler.edu
MatthewALanham.com

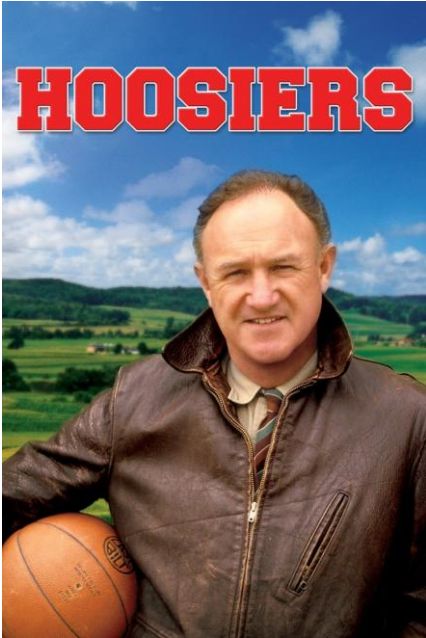
Paoli, IN – “The Heart of Hoosier Hospitality”



**44
today!**



2016 Purdue created the MS BAIM program – “we need a coach”

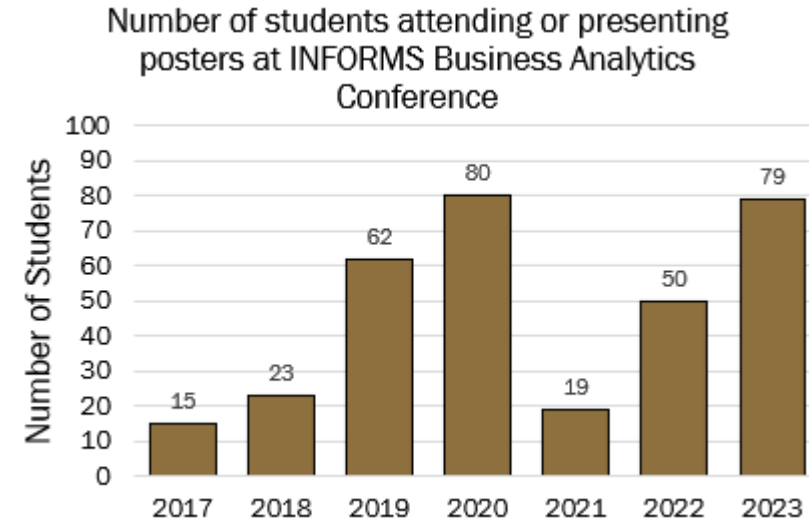
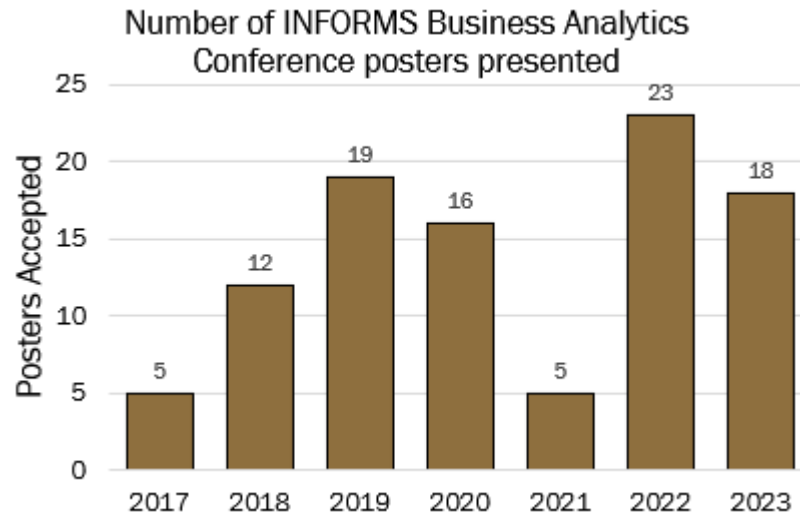


You can't do analytics projects without partners

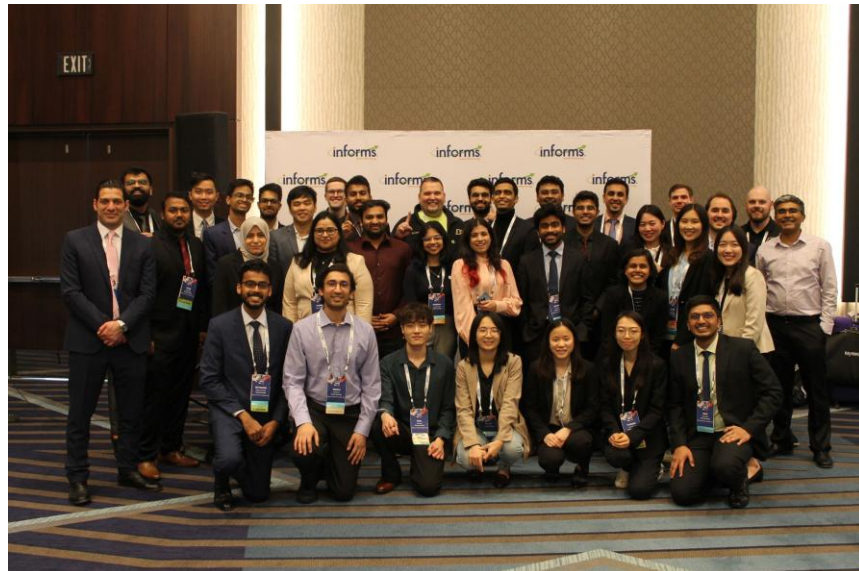


Demonstrate evidence of your knowledge, skills, and abilities.

98



63%



100%
2023 Cohort

Goal: Strive for excellence in your work and for serving others



INNOVATIVE EDUCATION ISSUE

COLLABORATION IS KEY
Inside the Academic-Industry Ecosystem



GRADUATE STUDENT SUPPORT

we do at Purdue). The Analytics Conference has been hosted in Las Vegas, Baltimore, Austin, Tempe, and most recently, Houston, and it will be held in Colorado in April 2023.

Our students love attending the Analytics

[1] M2 RAIM has been able to improve program outcomes even as we scaled from 25 students to 100 students. The average starting salary for our graduates has increased by 10% over the past year, from 90K placement in our first year class in 2007 to 100K in the third phase of our class. Starting salary in the first phase of the class at \$82,000 and increased over \$100,000 from the four-year class. This year, Study International named the Purdue M2 RAIM program as one of the top dynamic business schools in the world. The average starting salary of \$112,167 is just a bit to wish for. That's our past few years. *U.S. News & World Report*, probably the most widely read and respected source of college rankings, ranked the Purdue M2 RAIM program ninth among all graduate schools in analytics programs.

INFORMS has also elevated our outcome and community involvement over the years and recognized the Executive Office of Management Development as a leader for the 2002 UOPE Award for Public Policy. Our faculty, alumni and corporate partners could not be prouder of what has been accomplished and the position we find ourselves in today. This question you might be asking is how can we do better for our students and their outcome?

Urges Students to Join Professional Societies
From my perspective, one of the key reasons we have continued to improve over the years is because of our intentional focus on getting our students involved in professional societies. We have the INFORMS and professional conferences such as the INFORMS Eastern Analytics Conference. Many of our students join the INFORMS Data Mining and Analytics Society. We encourage them to do so because we provide them financial support to attend the Analytics Conference each spring. The student registration cost alone has been around \$600 per

Nurturing Future Edelman Winners
The goal of the MSBADM Future Edelman Impact Award is to inspire students to lead their future client or organization to apply to be a real Free

Edelman Award winner, to be the "best," which I define as an Edelman winner. Inspired by the competition, the students are tasked to use the Industry Practices (operational) course project as deliver empirically supported work that can be understood by the layperson and have measurable impact. The measurable impact part is typically "potential impact," given the short 12-week duration and scope limitations that you would expect from

From the students' perspective, they often went jump right into the technical work and some had tunnel vision on only that activity, but one of the professors learned learning is really having them step back and see how important it is in practice to follow structured design to come up with a solution to the business need. We have deliberately followed INFORMS Certified Analysts Professional (CITAP) Job Task Analysis (JTA) tasks for all projects to let students understand that many *careers* they may consider and question to see their stakeholders and the first round of the Future Educators Competition must make a five minute video presentation of their work. We have several component judges that score the projects to identify the best three projects that will make it to the final round. The rubric the judges use is as follows.

E-del-man Impact Evaluation Rubric

- Capable of being verified or disproved by observational or experimental research by following a structured step-by-step approach from data to decisions.
- Is there a technical innovation in this project? Innovation may stem from the creation of new designs and methods, as well as the application of existing methods to new problems or

- How does the solution provide recommendations, decision support, strategy or abilities in the context of the business need?
- Does or can the solution scale? The capacity for the solution to be changed in size or scale, use or production across a range of capabilities.
- Is this work portable to other applications or industries?

**FUTURE EDELMAN
IMPACT AWARD**

Rising Purdue University M.S. in Business Analytics and Information Management program intentionally focuses on student needs, outcomes

BY MATTHEW LANHAM

IF YOU HASTENED AN INFORMS BUSINESS ANALYTICS Conference in the past six years, you may have not noticed a significant number of students in attendance from Purdue University's MS in Business Analytics and Information Management (MS BAIM) program. Since the 2013 INFORMS Business Analytics Conference in Las Vegas, nearly 250 MS BAIM students have presented 80 posters showcasing work they have done with companies. In years when there was a poster session competition, these students demonstrated the quality of their work by winning the competition three times and placing four times. From an academic director's perspective, the students' work is impressive. The students have worked with business science students involved in experimental learning projects with companies and participating in case competitions or hackathons are natural business school activities. The primary responsibility is to ensure our students practice their skills outside the classroom curriculum and hopefully add another experience they can potentially showcase to employers later.

- What political, technical and managerial challenges had to be overcome in completing the project so it could be deployed, used or considered for future integration?

Lesson

- Is there a balance of rigor, technical jargon and layperson language so any audience can appreciate the work and its takeaways?

Impact

- What are the major quantified (e.g., dollars saved, revenue increased) and nonquantified (e.g., process streamlined, customer satisfaction improved) impacts of the work?
- How important was the work to the client?

Empirical	Delivery	Layman	Inspect
20%	20%	30%	30%

Once the top-three teams are identified, they work with a videographer to create a three-minute video that would appeal to a wider, general audience. It is similar to what real Riders on Award finalists would work with their marketing team to create a high-pitch video about their project. A great example is the first three minutes of the Memorial Sloan-Kettering team submission from 2021 [4]. In our student competition, the Purdue marketing team puts out teams pitch video on a website [5] and the students have one week to share the competition with others. After one week, whichever team has the most video YouTube "likes" is named the winner.

This process allows the team members to share their work with LinkedIn members, highlighting their presentation skills. It also highlights the MSBA's career program and opportunities for future industry partners collaborating with Purdue. This year's winning project was "A Hierarchical Approach and Analytical Assessment Optimization" by Uttarak Rajak, Anshu Chait, Priyanka Das, Dhruv Shivastava and Toolish Agrawal, who collaborated with a national retail chain. According to Das, "We anticipated each of our company's stores can increase its profits on average about \$150,000 per year by implementing the team's product assortment recommendation, which the company adopted to more than 86 million across the 6,000



5,669
YouTube likes

CCAC – Lets show everyone who Hoosiers really are!



1

ICU BUTLER UNIVERSITY Ψ PURDUE UNIVERSITY UNIVERSITY OF NOTRE DAME

We are pleased to announce the 1st Annual
Crossroads Classic Analytics Challenge
January 4 - January 18, 2021 • Hosted on Kaggle.com
Co-sponsored by Teachers Credit Union, Butler University,
Indiana University, Purdue University and the University of Notre Dame

2

CROSSROADS CLASSIC ANALYTICS CHALLENGE

FEBRUARY 25, 2022 | PURDUE UNIVERSITY

3

CROSSROADS CLASSIC DATA ANALYTICS CHALLENGE
JANUARY 2023

Hosted By: Butler University Lacy School of Business

BUTLER LACY SCHOOL OF BUSINESS

4

\$10,000 ANALYTICS CHALLENGE

2024 CCAC Sponsors

Competing Schools

<https://crossroadsclassicanal>

A photograph of two men sitting in the audience at a baseball game. They are both smiling and looking towards the camera. The man on the left is wearing a grey shirt and glasses. The man on the right is wearing a grey hoodie and glasses.

Started National Data4Good competition in 2022



BUTLER

We achieved great outcomes – but there was much struggle along the way



Create constancy of purpose toward improvement of product and service, with the aim to become competitive, to stay in business and to provide jobs.

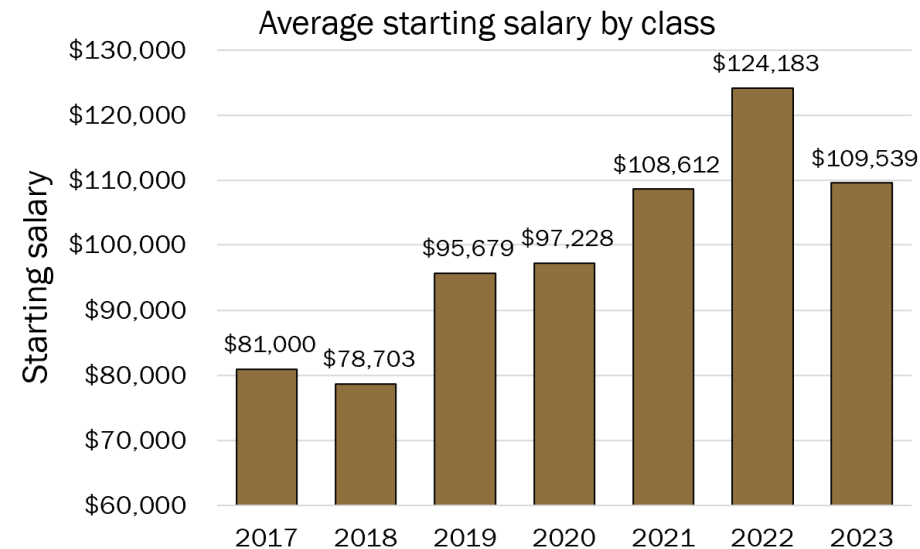
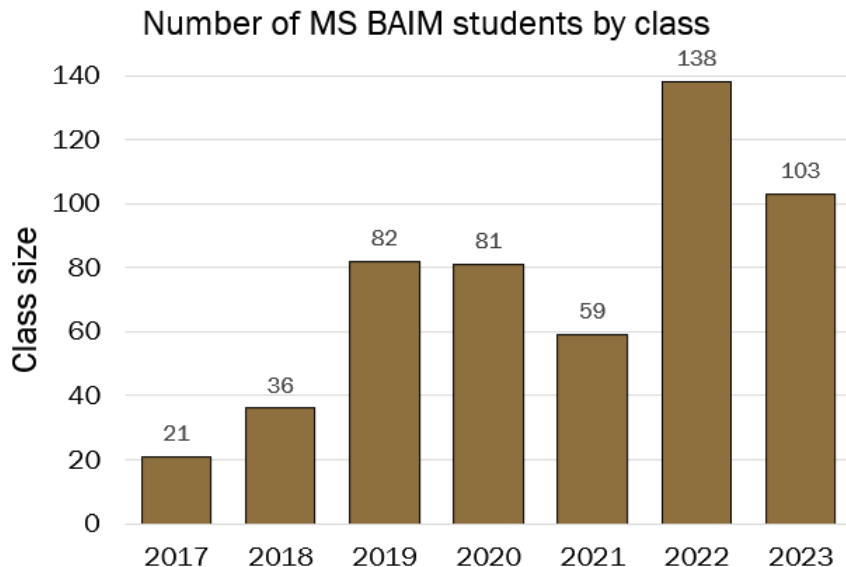
W. EDWARDS DEMING

Source: The W. Edwards Deming Institute

- Regular cheating scandals
- Cultural clicks – lack of comradery or care for others
- Imbalance of student support - outside Clinical faculty
- School didn't want to invest in the students... initially
- Alumni were weak at giving back/serving

Initially, there was no purpose

- no understanding of humility – only individual pride

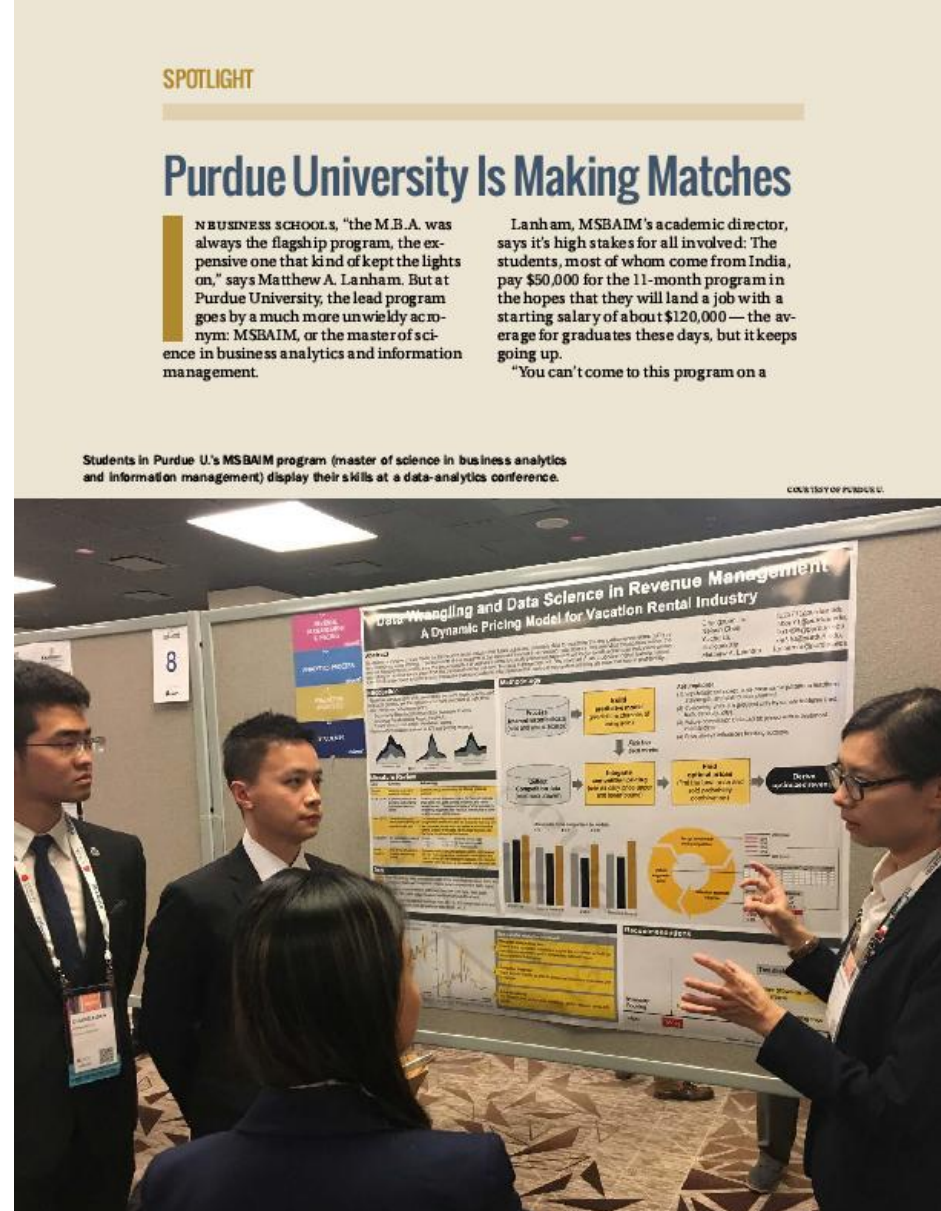
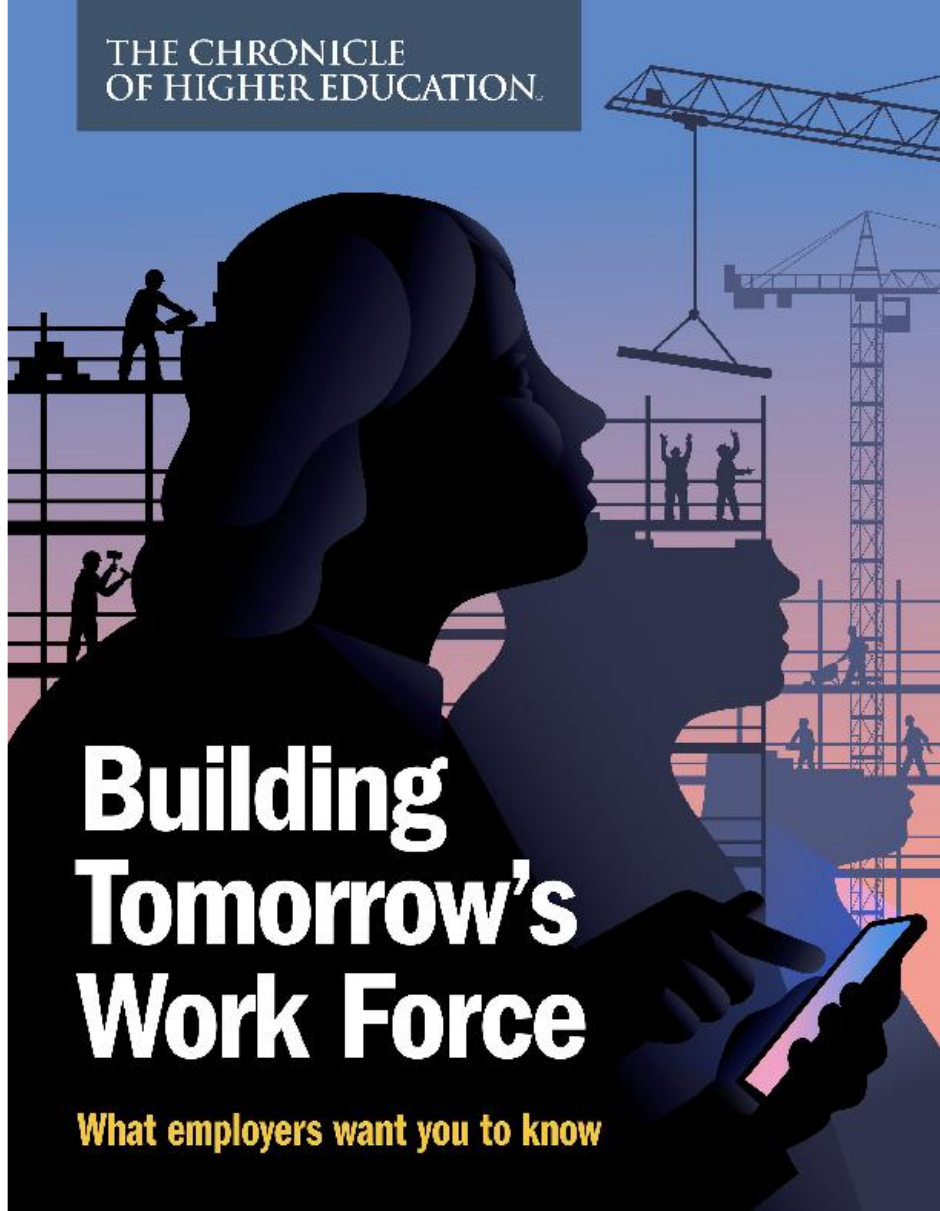


#12



#6

Eventually we turned things around and were getting noticed





Our purpose was to love one another and have a daily reminder of what that meant.

(I'll tell you about the towel at the end 😊)





Purdue Krannert Graduate Institute at the Daniels [+ Follow](#) [...](#)

School of Business

7,344 followers

5mo •

#Purdue MSBAIM students go beyond the classroom, applying their knowledge to make an impact on industries worldwide.

From developing global Bible translation tools to troubleshooting phantom inventory, their projects sparked transformative opportunities for the companies involved.

Read about these student's experience at previous case competitions and their award-winning projects: <https://lnkd.in/g2BYPN2c>

#BusinessAnalytics #MastersBusinessAnalytics #BusinessBoilermaker



54



Love

Comment

Repost

Send



ECS Hackathon 2021 -
WINNERS

PURDUE UNIVERSITY Krannert School of Management



**Student Poster Competition –
1st Place**

*Understanding and Predicting Project
Payment Latency*



Terrence Chou
PURDUE UNIVERSITY



Erika Ergart



Theo Ginting



Rassul Yespayev

M.S. in Business Analytics & Information Management Candidates



**Student Poster Competition -
3rd Place**

*Feature Engineering for Sparse Demand
Prediction*



Zinnia Arshad
PURDUE UNIVERSITY



Robyn Campbell



Cindy Yu



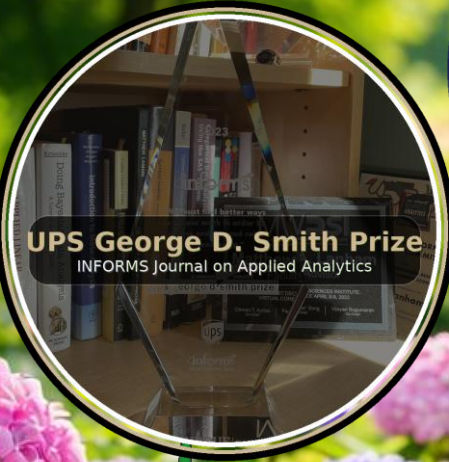
Stefanie Walsh

M.S. in Business Analytics & Information Management Candidates

I decided to try something new...



What's growing in my research garden?



Flowers growing in the garden

National Data4Good Competition – 2022 (Year 1)

Krannert School of Management Case Competition - Data Analytics for Good!

This competition is at the crossroads of critical thinking, data analysis, artificial intelligence, and communication.



For undergraduate and graduate students across the country to compete for \$25,000 in prize money.

Registrations close on November 9, 2022!

Phase I

Participate in an optional training from Microsoft expert trainers on Azure and AI fundamentals

Phase II

As a team, apply the learnings to develop a solution to the case provided by SIL International, on the kaggle.com leaderboard

Phase III

Top 3 undergraduate and graduate student teams are invited to Purdue University - West Lafayette for in-person presentations

Desire:

- Undergraduate and graduate divisions

Novelty:

1. “Data for Good” focus
2. Points-based
3. Free professional certification vouchers
4. Collaboration with our INFORMS professional community
5. Big time prizes (\$25,000)



Case: Captioning images in Children’s Bible stories for low-resource languages

Jointly Sponsored by:

Purdue Krannert / Krenicki Center, Microsoft, SIL International, and INFORMS



Data4Good Mission and vision

Mission: Provide college students an opportunity to improve their knowledge, skills, and abilities (KSAs) of data analytics for good.

Vision: To be the premier data analytics for good competition in the United States.

The points-based design was key! Nobody was doing that.

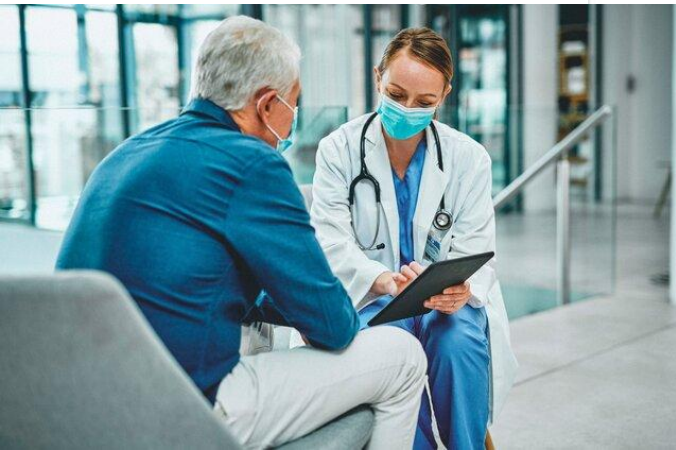
Date	Event	Completion Deadline	Individual points (max)	Team points (max)*	Percent
Regional Championship Points Breakdown & Key Dates					
Friday, October 17th	Competition Kickoff! Case Released from Sponsor	Friday, November 14th	200	600	3.6%
Friday, October 17th	<i>Team registration window</i>	Friday, October 31st			
Friday, October 24th	INFORMS CAP Framework Training	Sunday, November 23rd	200	600	3.6%
Friday, October 31st	DataCamp Datalab Training	Sunday, January 4th	200	600	3.6%
Friday, November 7th	AI-900: Microsoft Azure AI Fundamentals Training (3 hours)	Sunday, December 7th	650	1950	11.8%
Friday, November 7th	<i>Time window to schedule AI-900 certification</i>	Friday, November 28th			
Friday, November 14th	SAS Training	Sunday, December 14th	200	600	3.6%
Sunday, December 7th	"The Hero's Journey" Training	Sunday, January 4th	200	600	3.6%
Can begin after 11/14 SAS Training	SAS Badge (pick one among two available tracks)	Wednesday, December 31st	850	2550	15.5%
Can begin once scheduled	AI-900: Microsoft Azure AI Fundamentals Certification Score	Monday, December 8th	1000	3000	18.2%
	DataLab Case Submissions End & Evaluated	Sunday, January 11th 11:59pm EST	2000	6000	36.4%
Total			5500	16500	100.0%
National Championship Key Dates					
Tuesday, January 13th	Regional champions announced - top scoring undergrad/grad team by region (8 total teams) invited to JHU Cary School of Business				
February 2026 TBD	Final presentations at The Johns Hopkins University Carey School of Business				

Points incentivize students to participate throughout the competition instead of cramming at the end, as well as ensure MORE people have some tangible outcomes to put on their resumes if they are not the top business case modelers.

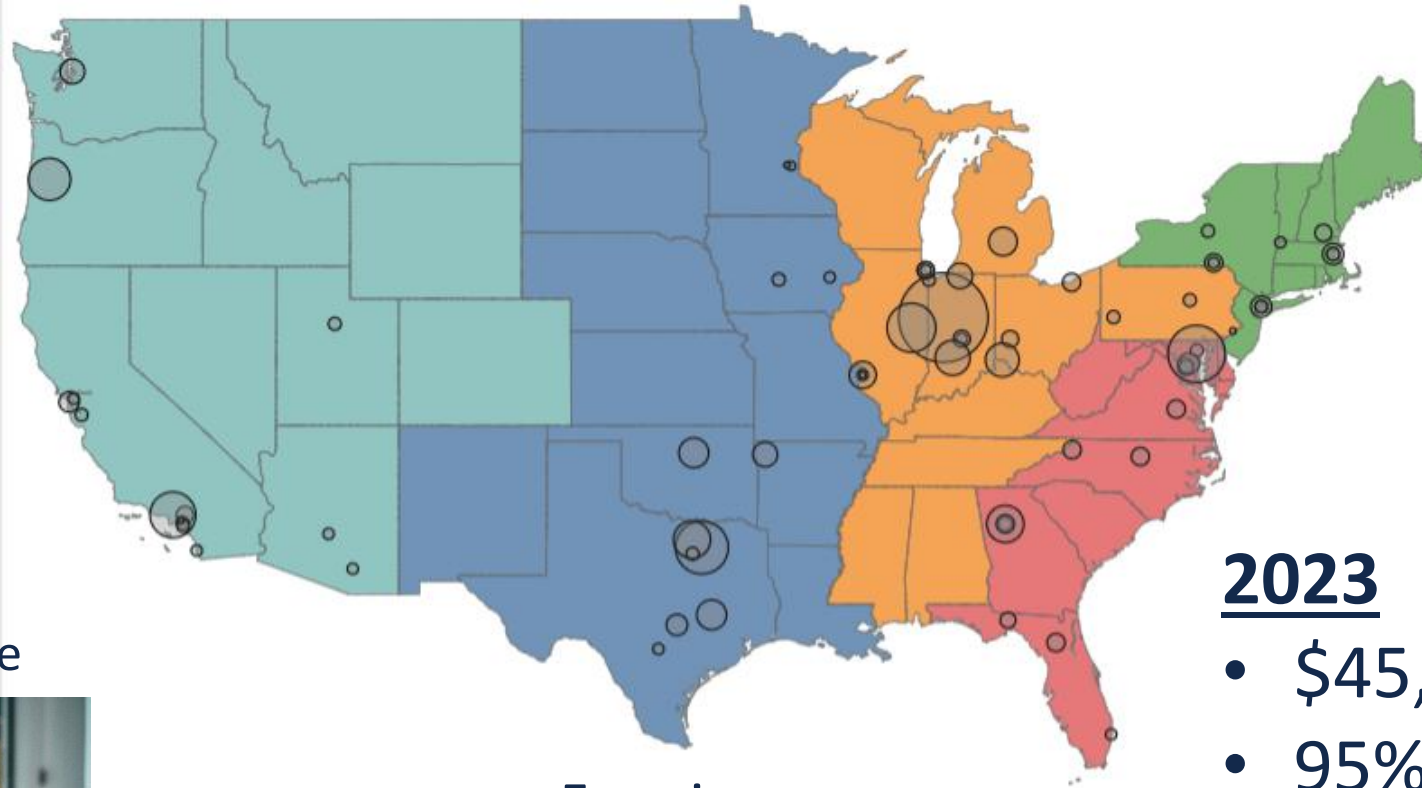
National Data4Good Competition – 2023 (Year 2)



Case: LLMs in Healthcare



693 students passed the AZ-900. 95% pass rate!



5 regions

2023

- \$45,000 in prizes
- 95% passed AZ-900
- 290 teams
- 1031 students
- 72 universities

National Data4Good Competition – 2024 (Year 3)



Mitch Daniels School of Business

[ABOUT](#) [STUDENT EXPERIENCE](#) [ACADEMIC PROGRAMS](#) [ACADEMIC DEPARTMENTS & RESEARCH](#) [OUTREACH & RESOURCES](#) [CAREERS](#)



It's Time to do Good, and not Grow Weary

Matthew Lanham

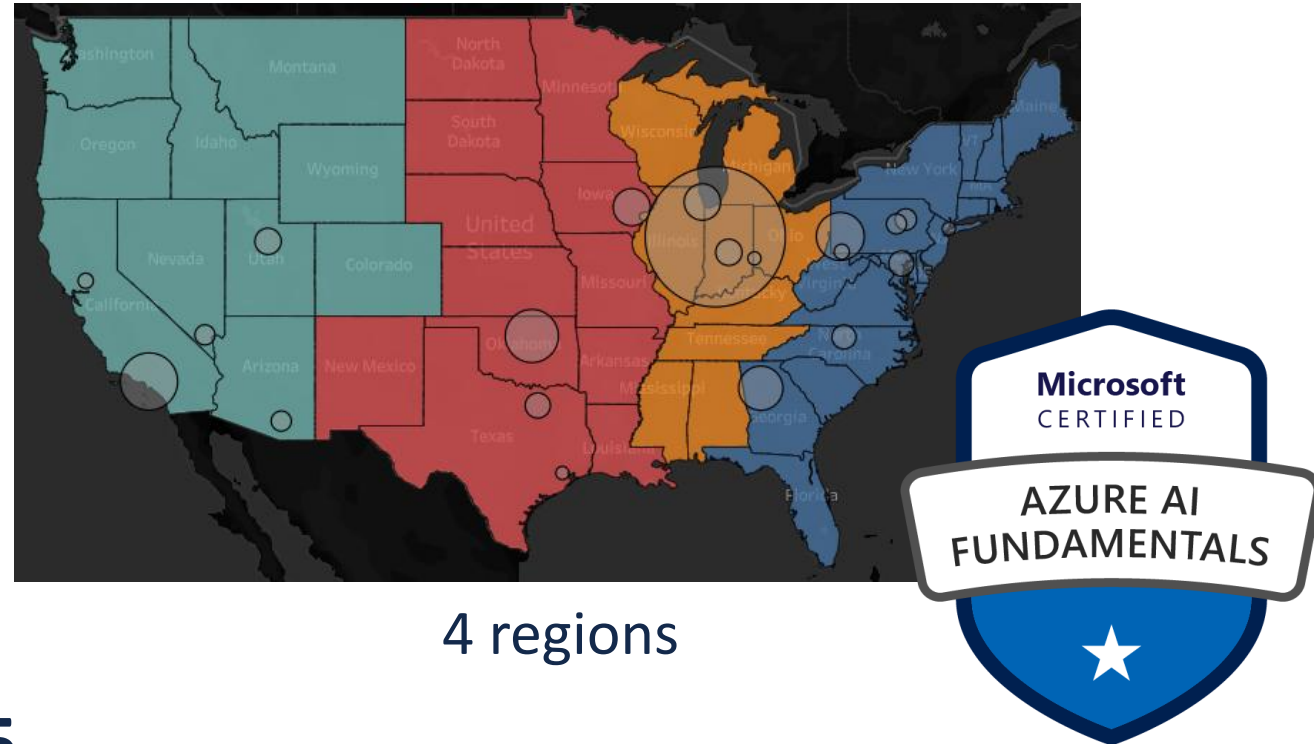
08-29-2024

Galatians 6:9 says "Let us not lose heart in doing good, for in due time we will reap if we do not grow weary."

Case: Understanding stages of grief



652 students passed the AZ-900. 95% pass rate!



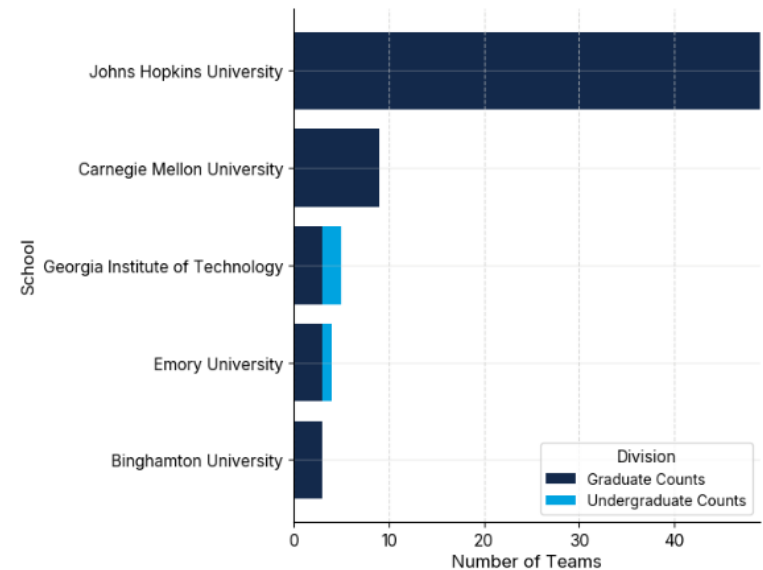
4 regions

2025

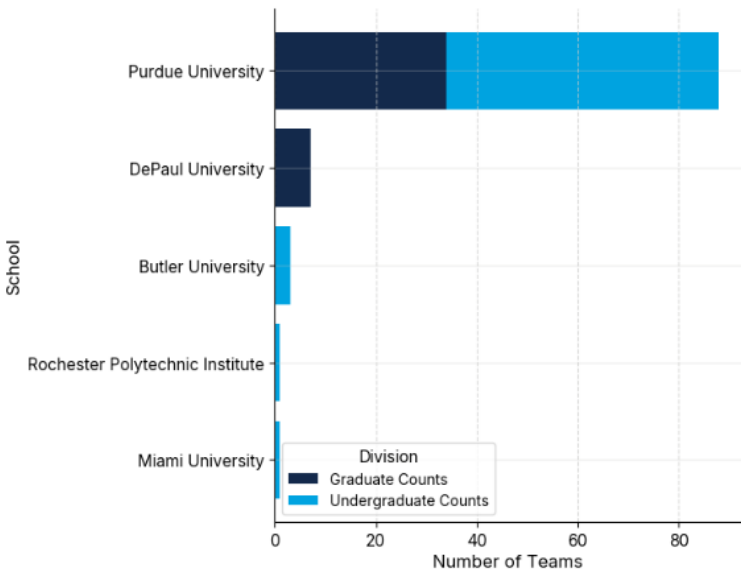
- \$31,000 in prizes
- 96% passed AI-900
- 295 teams
- 1106 students
- 105 universities
- 15 non-US schools

2024 Observation 1: student outcomes = f(faculty leadership)

Top 5 Schools in Region 1



Top 5 Schools in Region 2

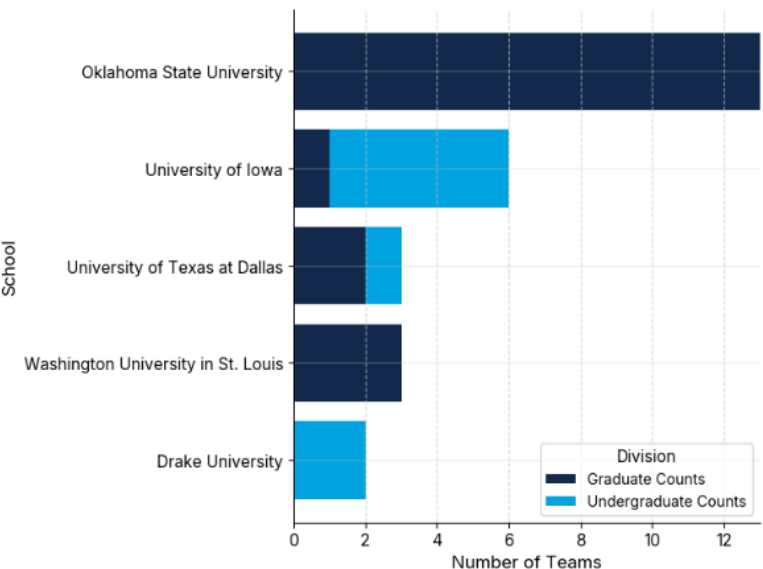


Having a faculty member/leader integrating the competition into their school/program makes a big difference!

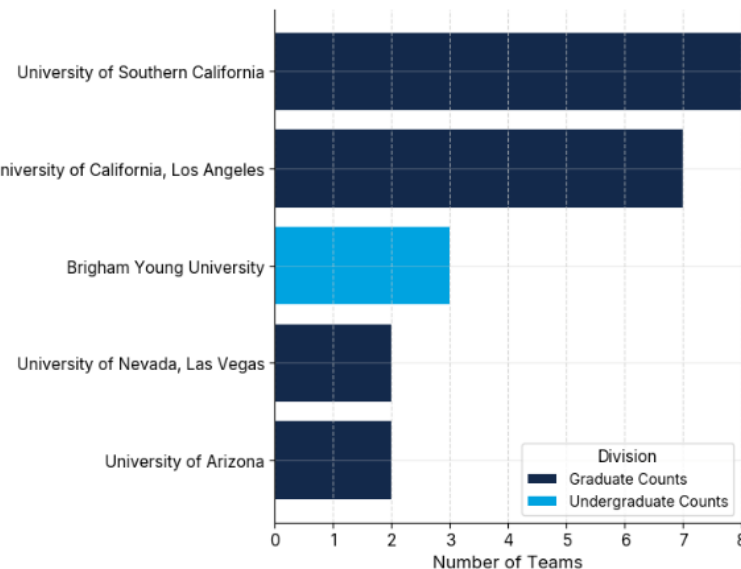
I stepped away from leading MS BAIM and asked to teach undergrads.

Ask and you shall receive!

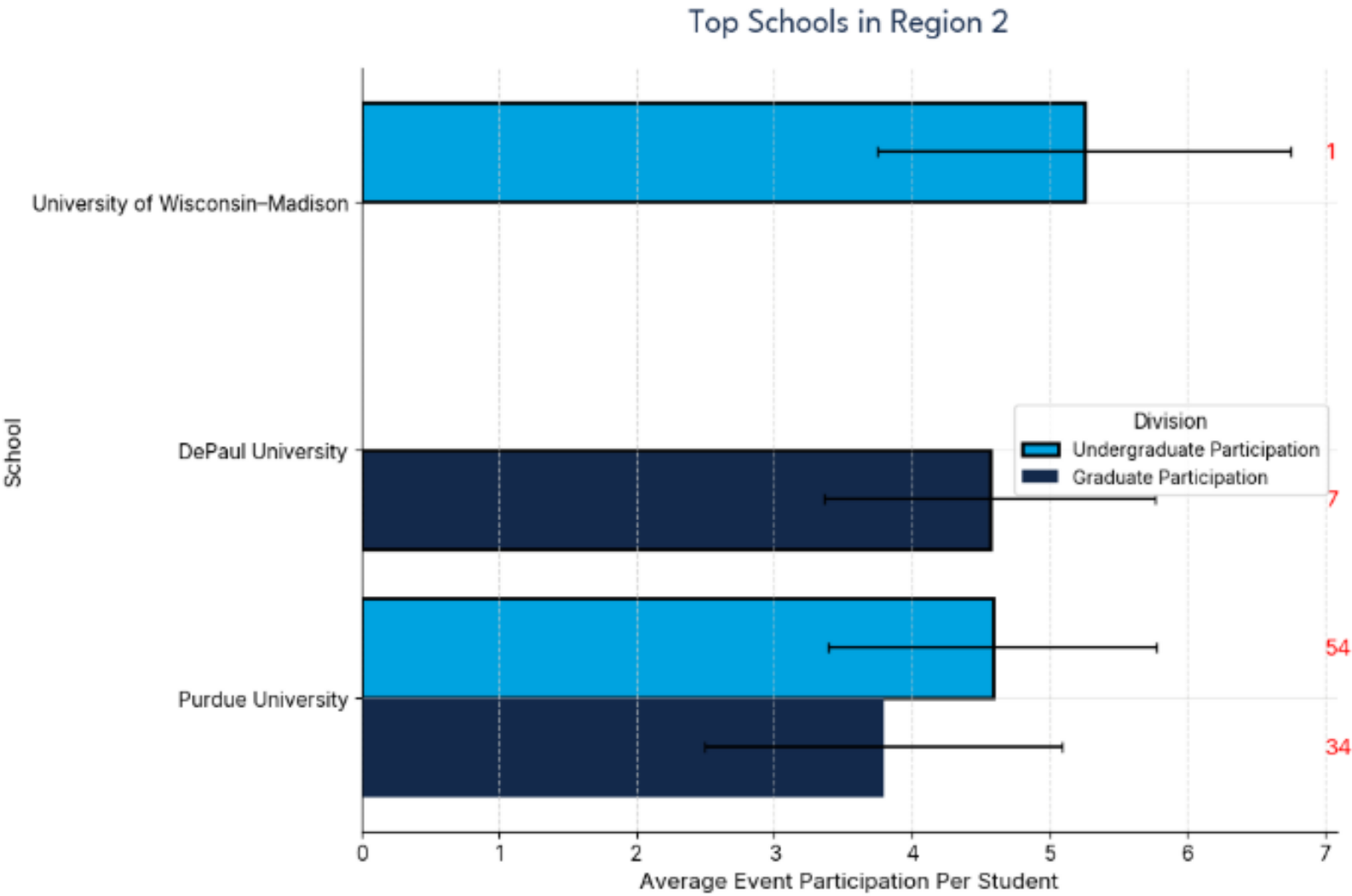
Top 5 Schools in Region 3



Top 5 Schools in Region 4



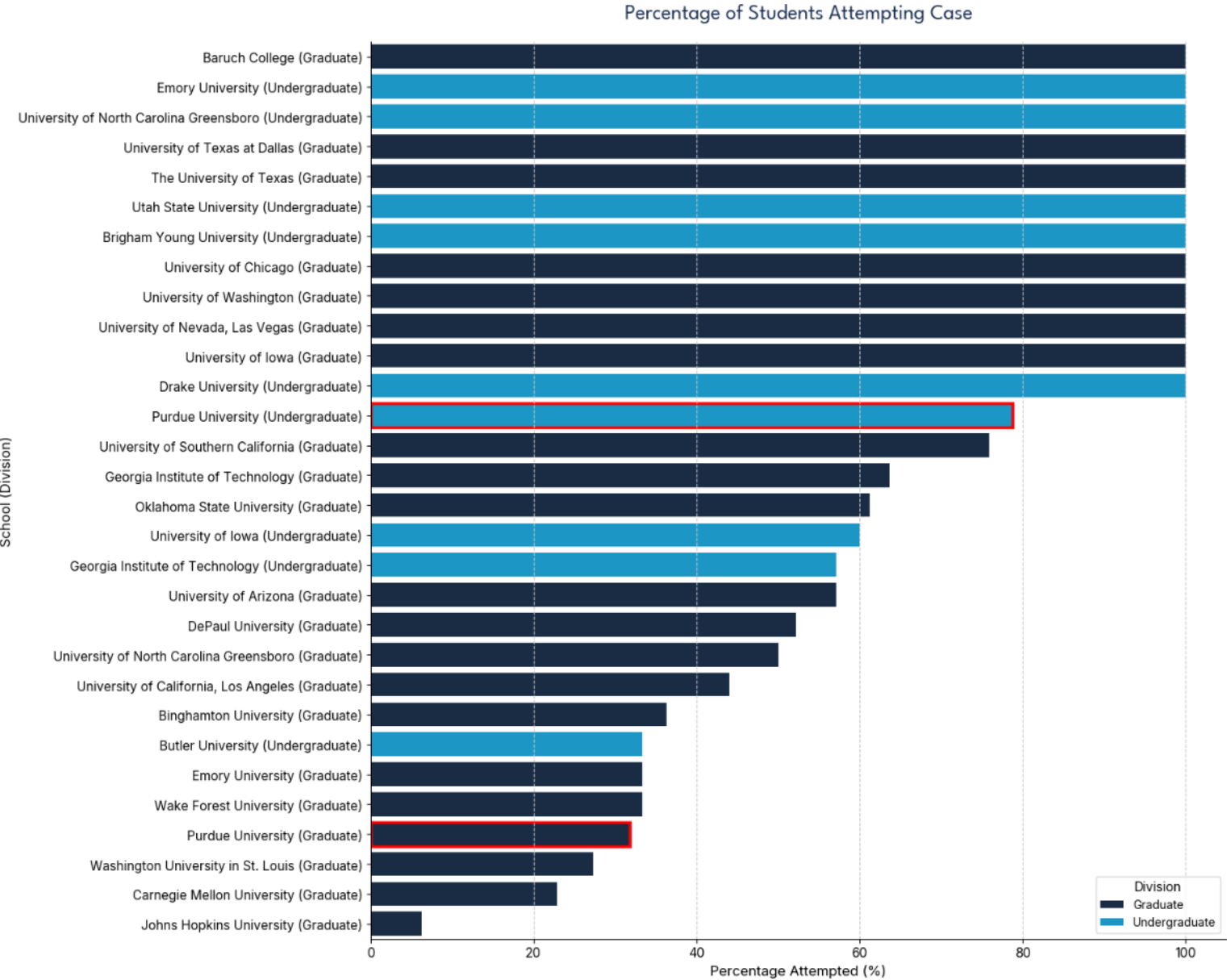
2024 Observation 2: Integrating into a class leads to higher participation



There were six events for points:

- 1. Kickoff
- 2. LLM RAG training
- 3. AI900 training
- 4. CAP training
- 5. AI Ethics training
- 6. AI900 practice exam

2024 Observation 2: Integrating into a class leads to higher participation



Most of Purdue’s undergraduate teams were students in my MGMT 473 Data Mining course.

Most of Purdue’s graduate teams were students in our MS BAIM program that quit making it part of a course.

Student outcomes (everyone is a winner – even the faculty leader!)



Matthew A. Lanham • You

Assistant Professor of Business Technology & Analytics at Butler University | A...

1yr •

Today we set a new undergraduate research record among **Purdue University Daniels School of Business** students participating in the Fall **#Purdue** Undergraduate Research Expo with over 50 posters. I'm really proud of my 147 **MGMT 473 #DataMining** students that showed up to present their **#Data4Good** work. Thanks to the **Tragedy Assistance Program for Survivors (#TAPS)** for giving us this wonderful opportunity. It's been a great semester!

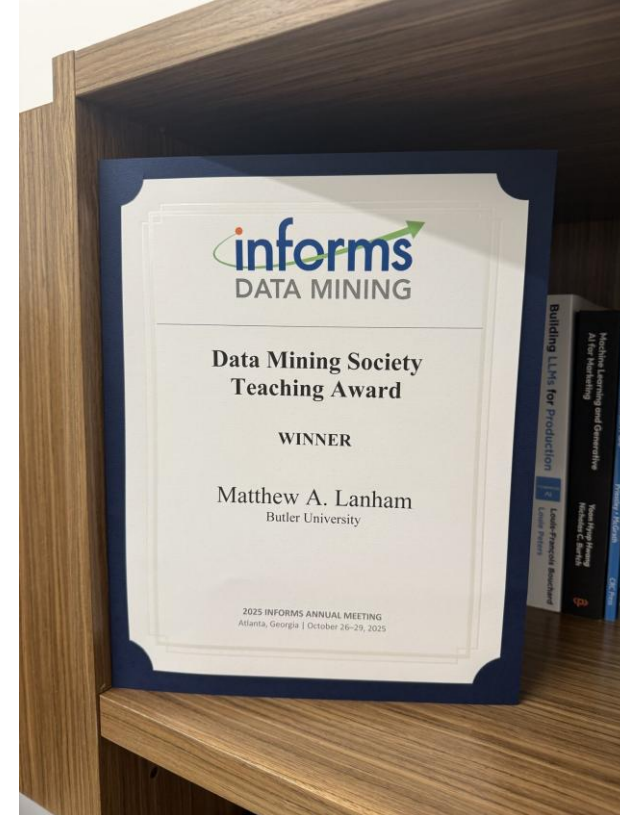
Check out the pictures from today's poster session here:

<https://lnkd.in/gAJCmZWw>

Krenicki Center for BA and ML Purdue University

BAIM Association

#Analytics #DataScience



National Data4Good Competition – 2025 (Year 4)

Catalog ▾AI Upskilling ▾Resources ▾Pricing ▾For BusinessFor Universities

Q🌐 ENLog InGet Started

Data4Good 2025 - National Student Competition

The Data4Good Competition is a national challenge for undergraduate and master's students to tackle real-world cases using data analysis and AI. Participants can win prize money and gain free training and certifications. Judges will select winners and runners-up in each U.S. region, with regional winners invited to present at The Johns Hopkins University Carey School of Business.

Register Your Team

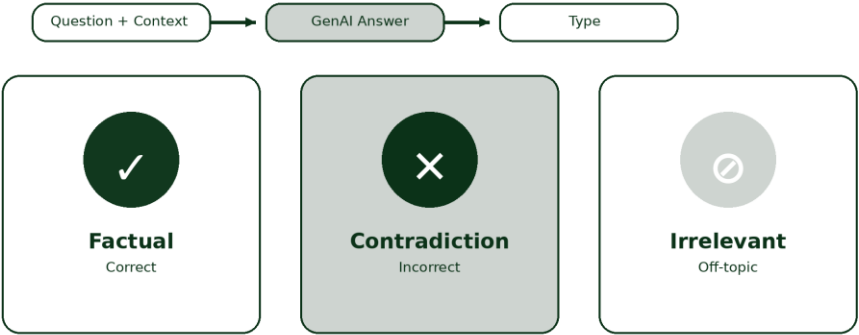


Launch Date	Event	Deadline	Link	Individual points (max)	Team points (max)	Percent
10/17/25	Competition Kickoff! (Webinar)	11/14/25	Join	250	750	4.67%
Can begin anytime	Team Registration Window	10/31/25	Register	N/A	N/A	N/A
10/31/25	INFORMS Analytics Framework™ (IAF™): The Proven Guide to Developing Analytics Solutions (Webinar)	11/31/25	Join	250	750	4.67%
11/10/25	Mastering AI-900: Microsoft Azure AI Fundamentals Training (3 hours Webinar)	12/10/25	Join	250	750	4.67%
11/14/25	Unlocking SAS Academic Resources (Webinar)	12/14/25	Join	250	750	4.67%
10/31/25	Business Problem Framing Free Course (code to take course for free will be shared on 10/31/2025)	12/24/25	Complete	250	750	4.67%
12/05/25	Using "The Hero's Journey" In data and AI (Webinar)	12/20/25	Join	250	750	4.67%
Can begin anytime	Complete AI-900: Microsoft Azure AI Fundamentals Certification Score	12/18/25	Register to take the exam or upload your scores from last year	1000	3000	18.69%
Can begin anytime	Complete SAS Badge (pick one among two available tracks)	12/31/25	Complete	850	2550	15.89%
Can begin anytime	Case Challenge Submissions	01/11/26	Solve Case	2000	6000	37.38%

2025 – GenAI reliability



GenAI Answer: Correct vs Incorrect

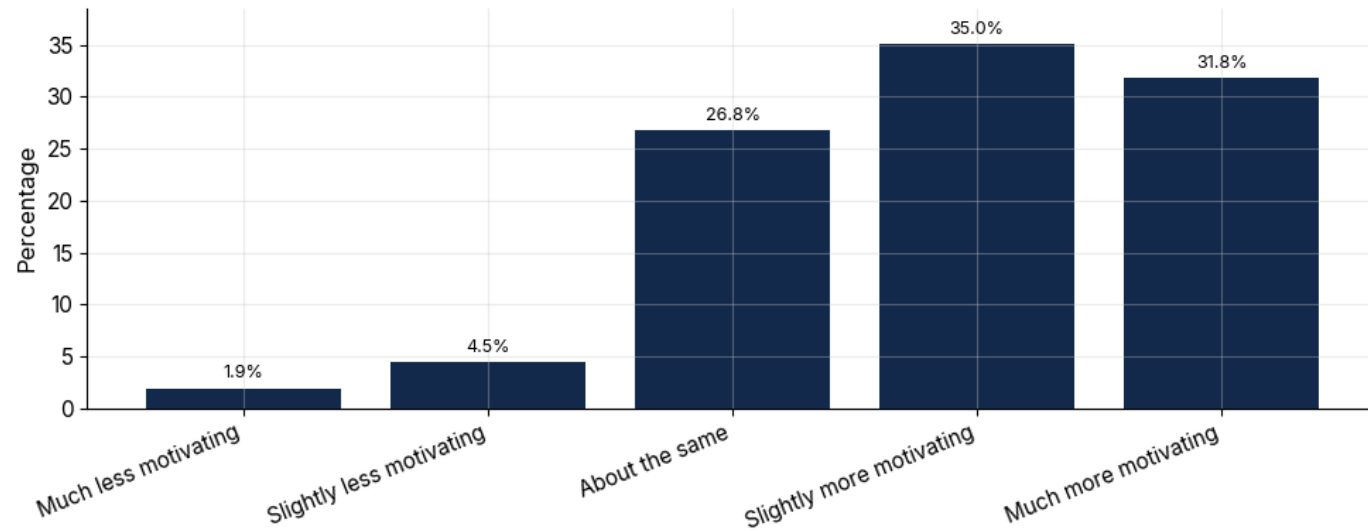


2025

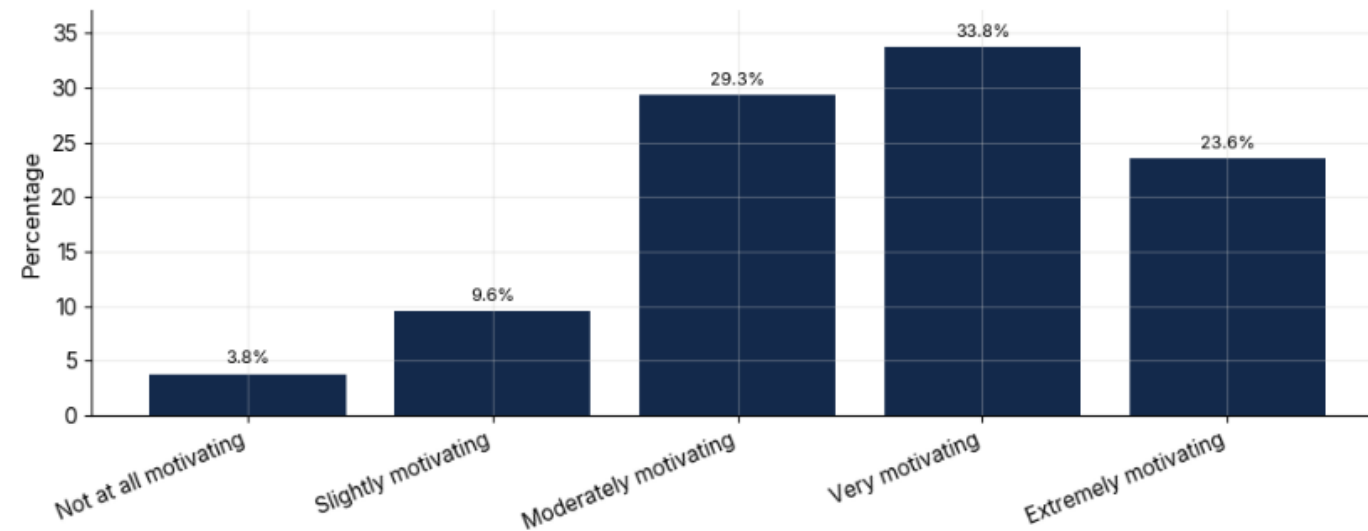
- \$31,000 in prizes
 - 96% passed AI-900
 - 295 teams
- 1106 students
 - 105 universities
 - 15 non-US schools

Students prefer an altruistic “good” case

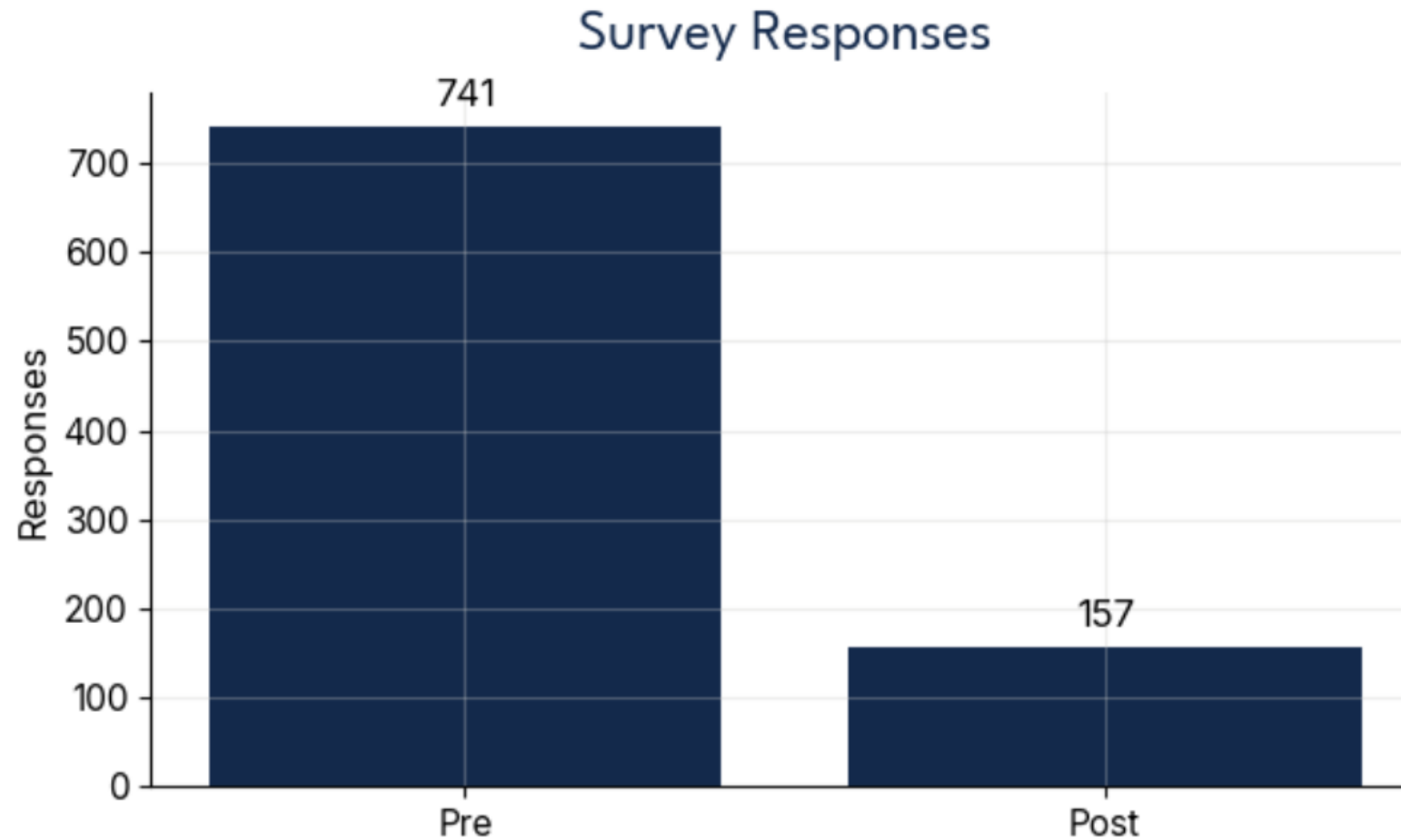
Compared to competitions focused primarily on commercial or profit-driven objectives, how motivating did you find this socially or altruistically oriented problem?



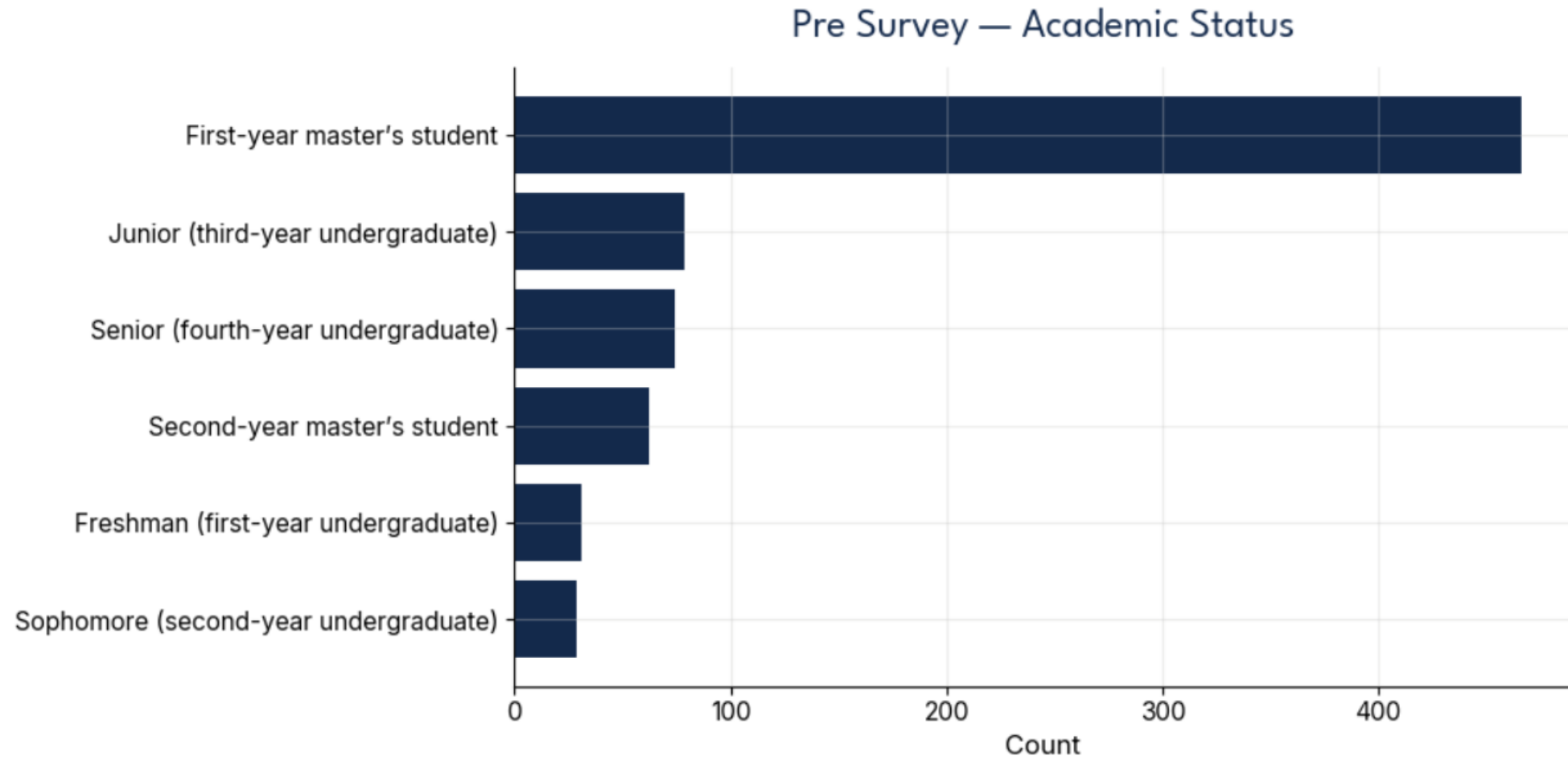
To what extent did the altruistic or ‘for good’ nature of the competition problem increase your motivation to engage deeply with the competition?



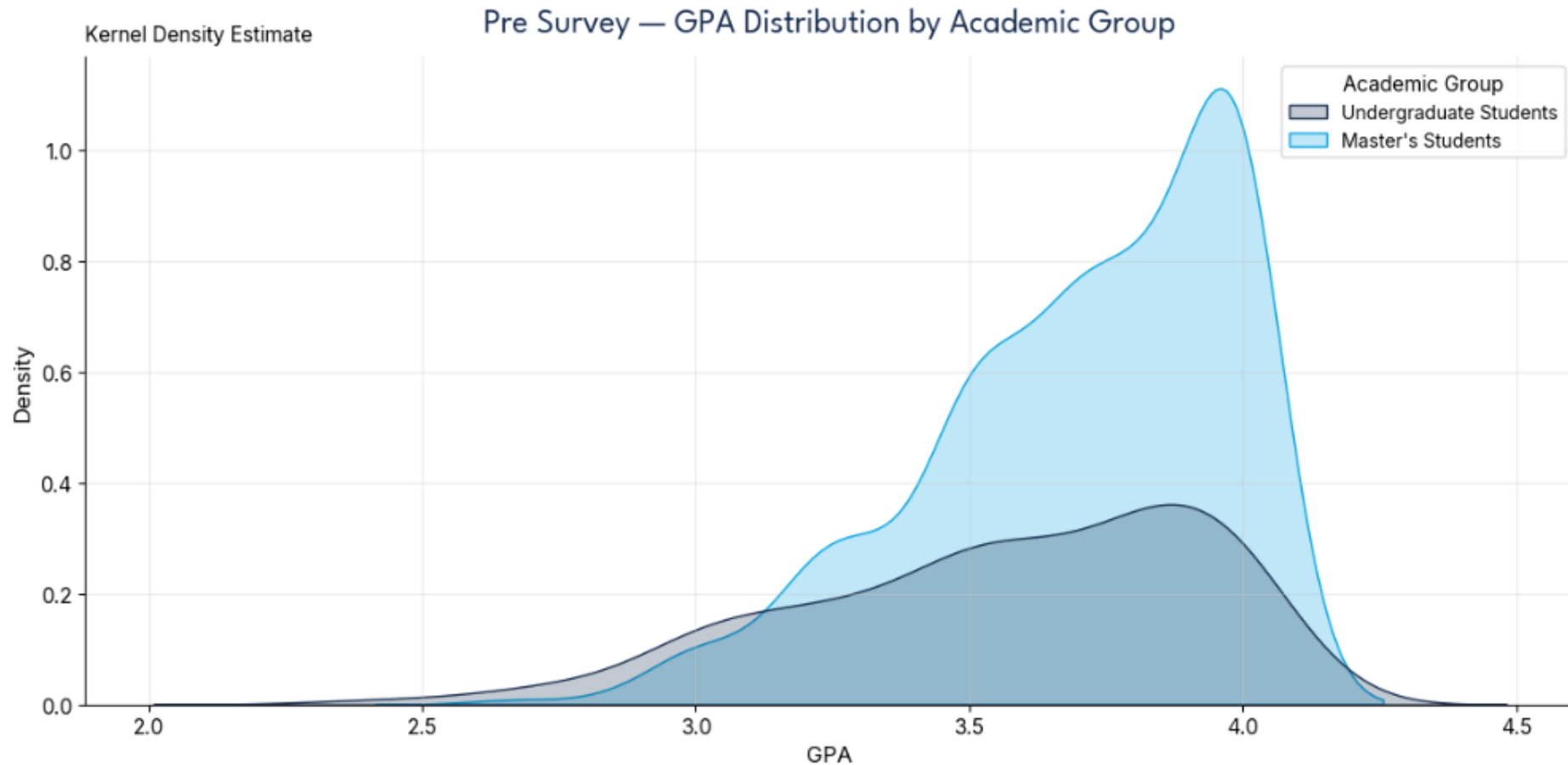
Student Feedback



Strong turnout among masters' students



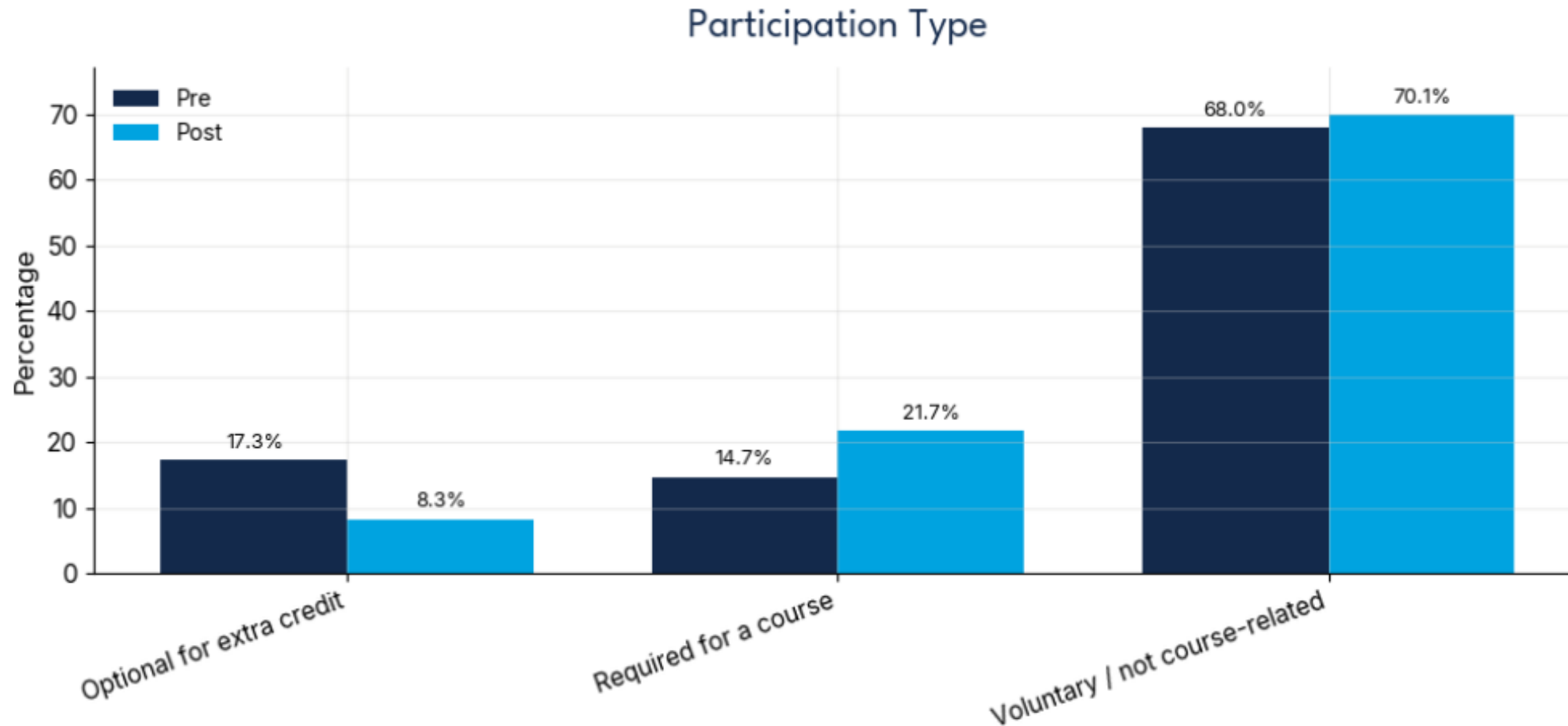
The competition is not just for the high performers



Questions:

- Are less talented students finishing the race?
- Are we helping everyone, not just already high performers, showcase their knowledge, skills, and abilities?

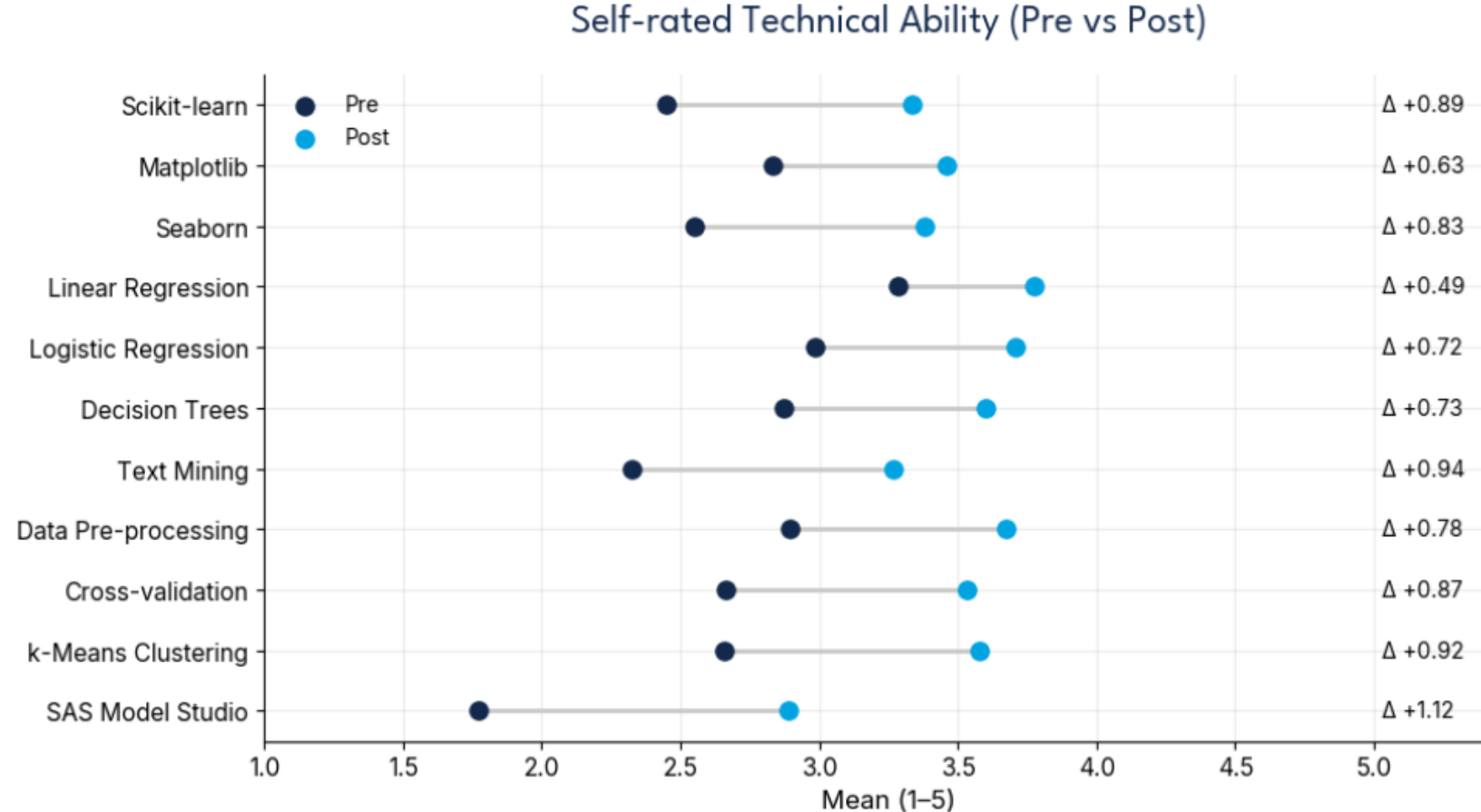
Most people continue to participate outside of class



Question:

- What is the expected student performance gains when integrating the competition into a class versus not?

Student's perceptions of their skills improved in every category.



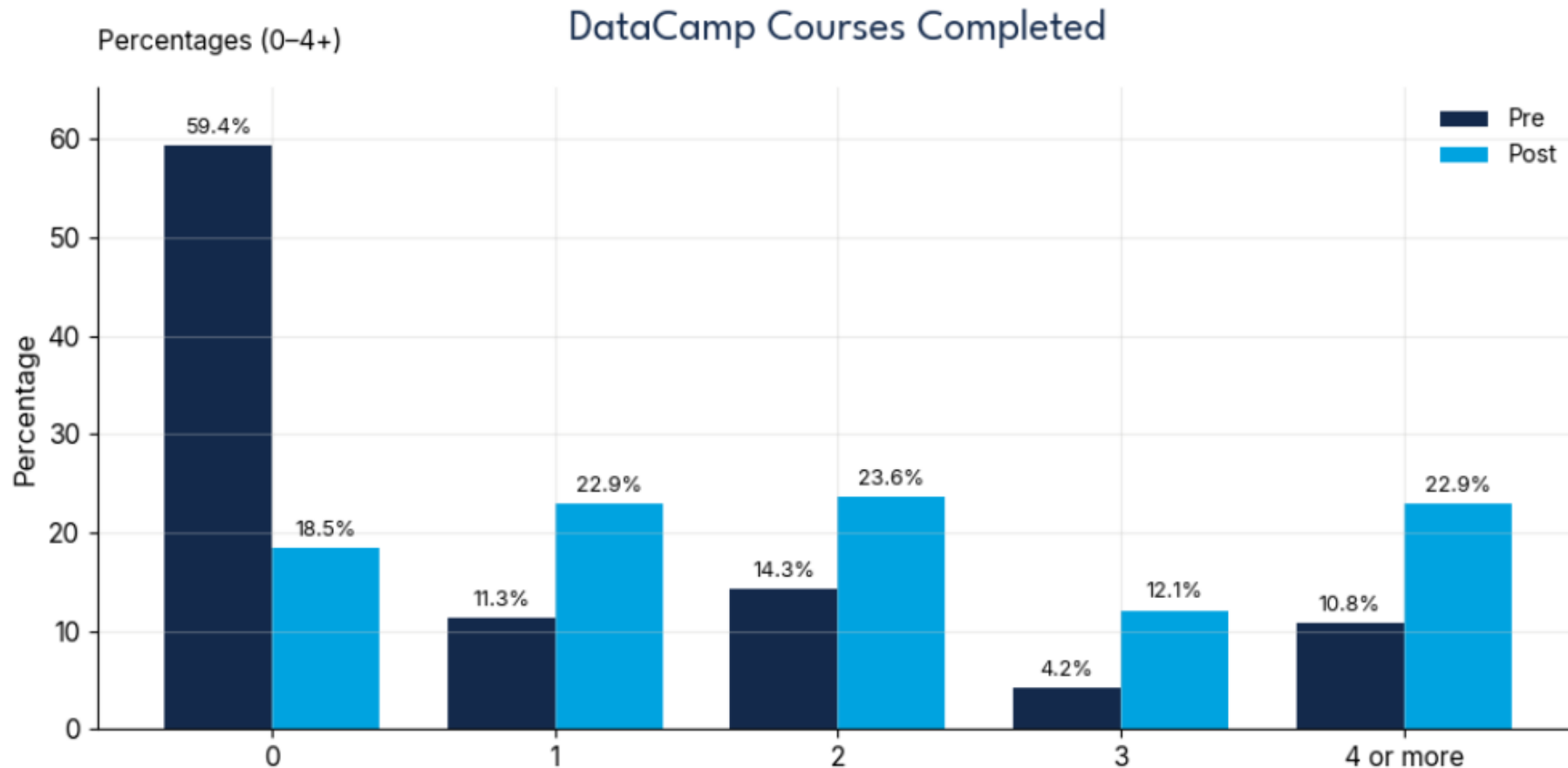
Cronbach's α (skills battery) – Pre : 0.948

Cronbach's α (skills battery) – Post: 0.962

Question:

- What is the perceived change in student's knowledge, skills, and abilities in certain areas?
- Are these perceptions different among degree level or degree major?

While not part of the competition points, participants completed DataCamp courses on their own



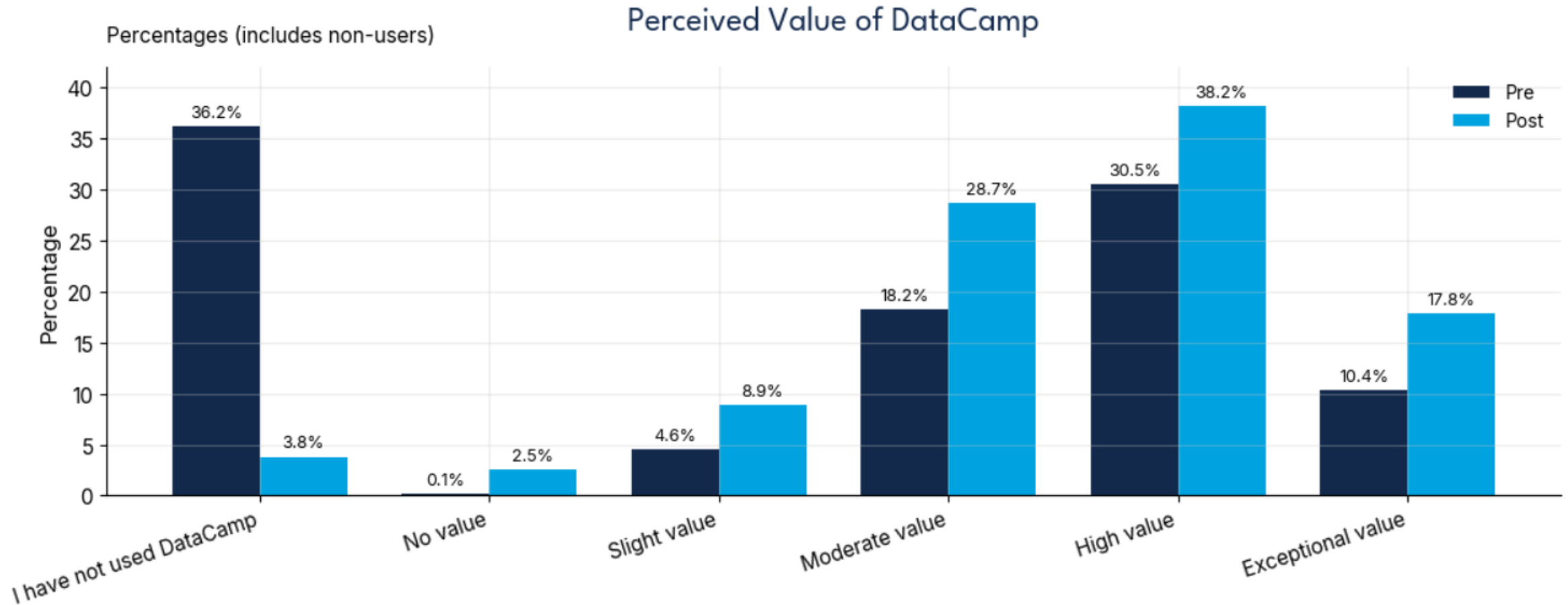
Note: Awaiting actual counts and course students in competition completed from DataCamp

BUTLER

Question:

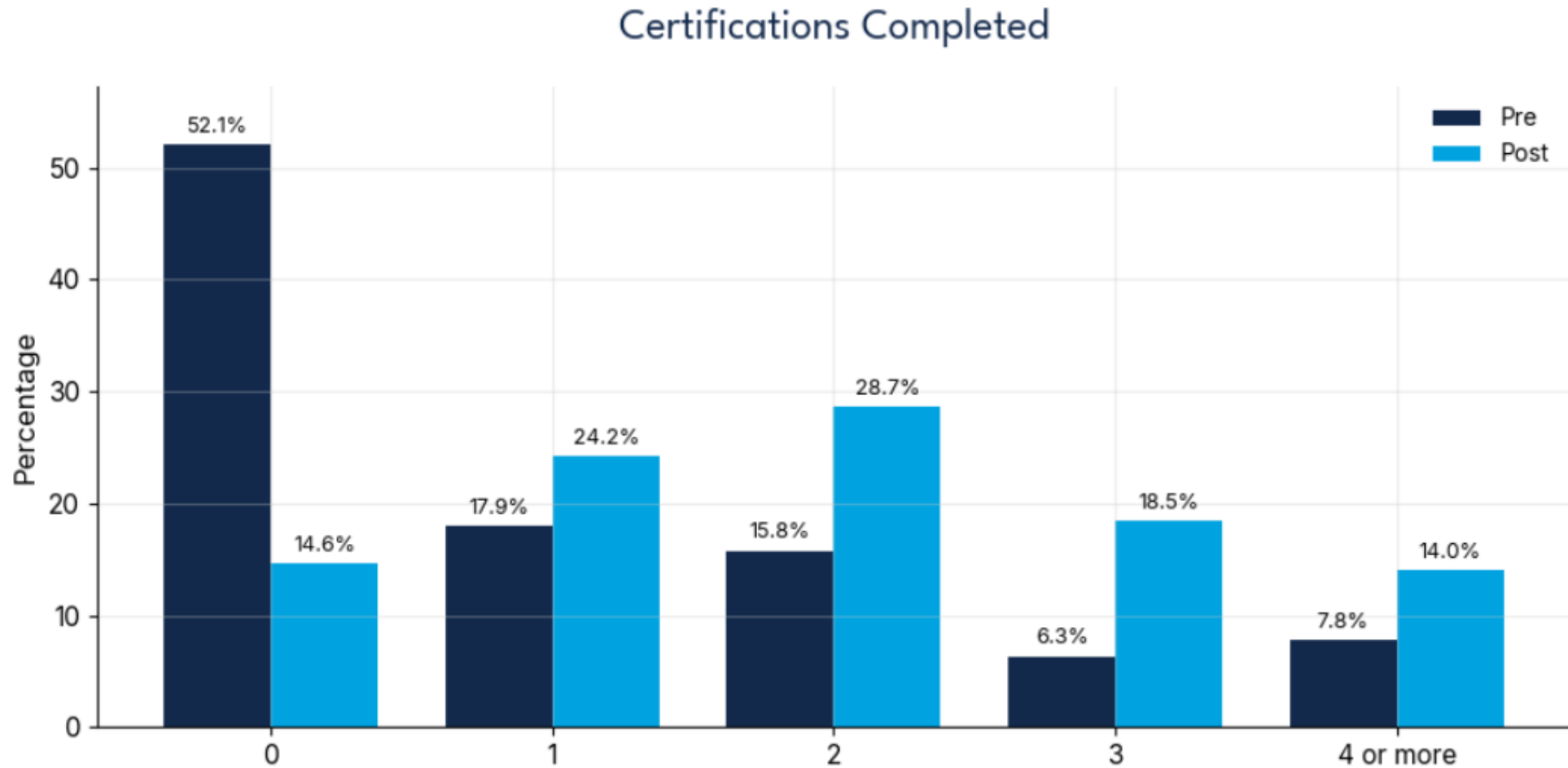
- Is there a relationship in perceived important in KSAs based on number of DataCamp courses completed?

Participants perception of DataCamp improved

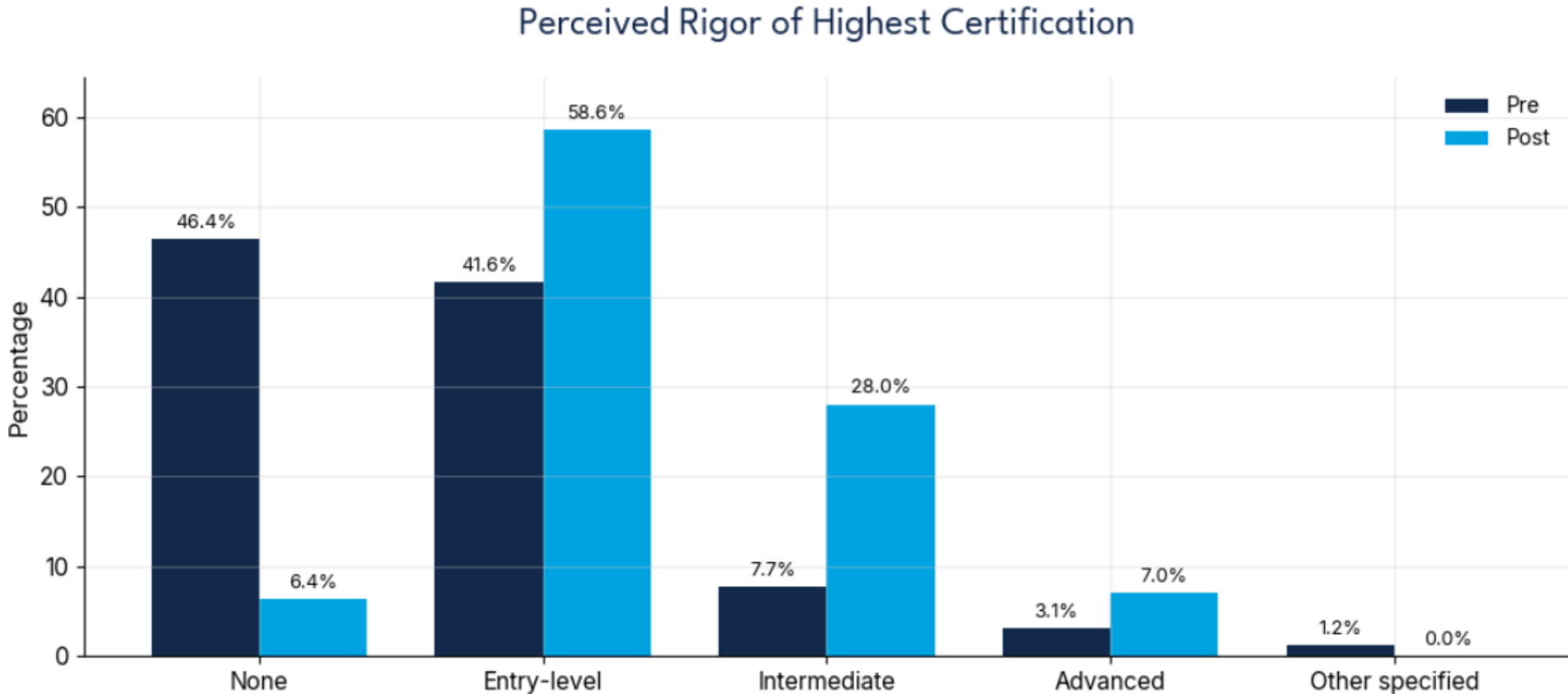


DataCamp was always a blessing for my Purdue students, plus it's FREE, so I'm also integrating DataCamp into my courses here.

Participants are earning more certifications



Participants are earning more certifications



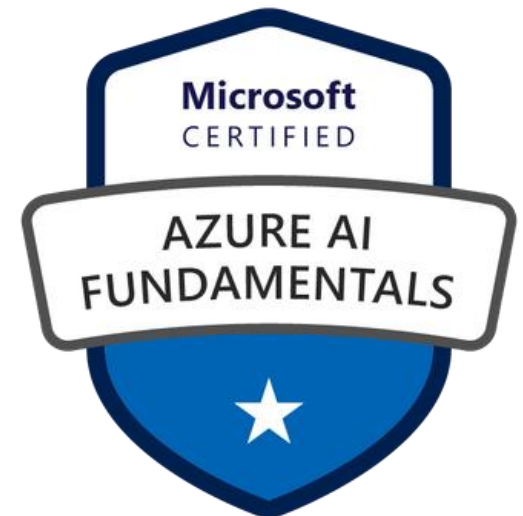
Note: AI-900 was anchored as an “Entry-level” certification for both pre- and post- questions

96% pass rate again on AI-900!

240 participants passed the AI-900
at a 96% pass rate!

Regional breakdown					
Region	Candidates	Passed	Failed	Pass rate	Avg score (Passed)
Region 1	89	86	3	96.6%	872
Region 2	133	127	6	95.5%	891
Region 3	4	4	0	100.0%	900
Region 4	25	23	2	92.0%	890

Top schools (by Passed)	Count
Purdue University	59
Butler University	43
Johns hopkins university	23
American University	9



BUTLER

Nearly 200 SAS Knowledge Badges earned!



Rochelle Fisher  • 1st

Higher Education | Strategy & Innovation | Ethical AI

2w • 

SAS was a proud sponsor of the Data4Good2025 competition, empowering students to fight misinformation in education using data and AI. Over the course of the competition:

- 200 students received training in SAS software and academic resources
- Nearly 200 SAS Knowledge Badges earned

Thank you to everyone who joined us in shaping a future where analytics makes a difference! We look forward to connecting with finalists **The Johns Hopkins University** in February.

Lori Downen Data4Good Analytics Competition **Matthew A. Lanham**

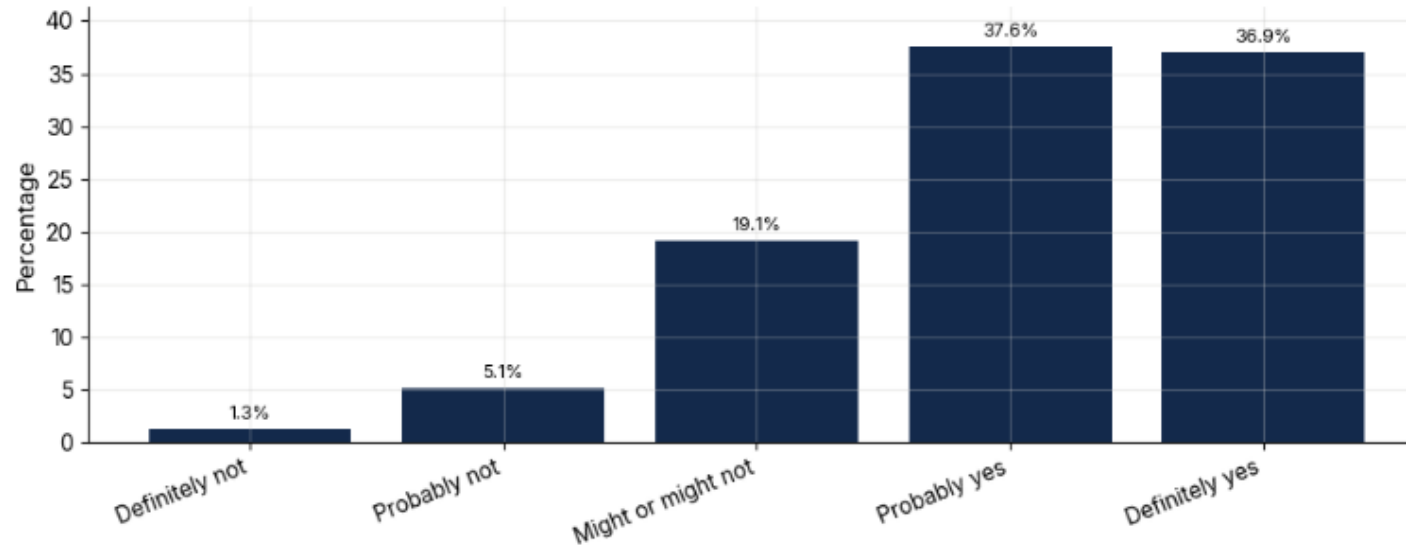
<https://lnkd.in/eK5VrEvy>

#AnalyticsEducation #AI #DataForGood #HigherEd



How can we get faculty to incorporate competition into their classroom or program?

Do you believe you would have spent more time on this competition had an instructor at your university made the competition as a graded course component?



I'll be presenting at the INFORMS Meeting for Analytics Program Directors (MAPD) in April. I need to share this with them!

Everyone is a winner when they participate!

Butler was a \$2,000 regional champion!

Region 3 – Undergraduate						
index	Rank	Team Name	School Name	Total Points	AI-900 Training [Sunday, December 10th 2025]	Business Problem Framing [Sunday, November ...
91	1	Dawghouse9	Butler University	11565	750	750
87	2	ButlerBusiness5	Butler University	11382	750	750
97	3	Observatory8	Butler University	10427	750	750
90	4	Data Dawgs	Butler University	9665	750	750
94	5	Holcomb3	Butler University	9649	750	500
92	6	Esports14	Butler University	9599	750	750
83	7	BackTable	Butler University	9455	0	500
93	8	Hinkle10	Butler University	9349	750	750
96	9	Midtown1	Butler University	9282	750	750
130	10	jet2 holiday	Purdue University	9224	750	750
88	11	Colonnade7	Butler University	8999	750	750
89	12	Commons13	Butler University	8982	750	750
84	13	Butler Bias	Butler University	8732	750	750
85	14	Butler Blue	Butler University	8104	750	500
99	15	Traditions16	Butler University	7149	250	750
95	16	Innovation2	Butler University	6800	750	500

Rows: 49 [↓](#) [Expand](#)

BUTLER

My course: 94% (50 / 53) passed AI-900 with average of 85%

Every student/team could have their own poster...

Data Dawgs

Data4Good Competition



BUTLER
LACY SCHOOL
of BUSINESS

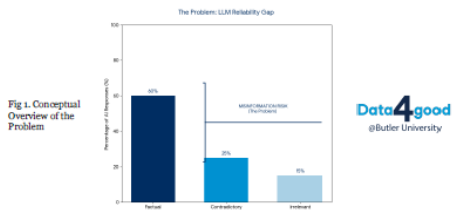
Katie Mihelic, Luisa Hungria, Italy Lewis, Jinna Hyatt, Dr. Matthew Lanham (Advisor)
Butler University Lacy School of Business
kmihelic@butler.edu; hungria@butler.edu; itlewis@butler.edu; jhyatt@butler.edu

ABSTRACT

This project is the result of the 2025 Data4Good Competition and aims to leverage data analytics and machine learning capabilities to solve a real-world problem that has significant positive impact on society. The purpose of this project is to derive valuable insights from the given dataset and build a model that can enable informed decision-making. The importance of this project is that it has the ability to make the solution more efficient, accurate, and effective with the use of data analytics. On the technical side, we used techniques such as data cleaning, analysis, feature development, and modeling with the use of Python and the DataCamp DataLab.

BUSINESS PROBLEM FRAMING

- The project addresses the problem of misinformation generated by large language models (LLMs) in educational settings. The central question is whether an AI-generated answer to a question is factual, contradictory, or irrelevant, given the question and supporting context.
- As AI tools are increasingly used by students, incorrect or irrelevant AI responses can mislead learners and undermine trust in educational technology. Accurately identifying unreliable AI-generated content is essential for responsible and safe use of LLMs in education.
- Primary stakeholders include educational institutions, students, educators, and developers of AI-powered learning tools who rely on accurate and trustworthy AI outputs.
- The project uses a labeled dataset of question-answer pairs and is constrained by data quality, class balance, and the need for interpretable and generalizable models. Performance is evaluated using a weighted confusion matrix that equally prioritizes all classes.
- The solution supports improved AI reliability, reduces the risk of misinformation, and enables safer integration of LLMs into educational platforms by flagging incorrect or irrelevant responses.



ANALYTICS PROBLEM FRAMING



Problem Statement:
This is a multi-class classification problem. Given the question-answer pair, the goal is to classify the type of relationship between them into one of the predefined categories: "factual", "contradictory", or "irrelevant".



Clear Assumptions:
The clear assumptions highlight that the data quality is representative, embedding models effectively capture semantic meaning, preprocessing enhances performance, features are sufficient for classification, and class imbalance is noted as an area for potential improvement.



Success Metrics:
• Overall Accuracy: Giving a general measure of the model's effectiveness.
• F1-Score (per class): Balanced measure of model's precision and recall.
• Confusion Matrix: Breakdown of each model's strengths and weaknesses.



Justification:
This analytical problem is justified by the critical need for robust models that can accurately classify nuanced text relationships in real-world applications, despite significant class imbalance.

DATA

- Important Data Relationship:**
- The "type" label is determined by collective semantic meaning and coherence derived from "question", "answer", and "context" fields.
- Business Problem Framing Reflection:**
- Addresses a critical business need to automate question-answer classification by framing it as a multi-class text classification problem, leveraging NLP and machine learning.

Feature	Priority	Description	Role
type	High (target variable)	Categorical label: factual, contradiction, or irrelevant.	Primary outcome variable to predict.
question	High (feature)	Text string representing the user's query.	Essential input for intent and context understanding.
answer	High (feature)	Text string containing the provided response.	Crucial for evaluating correctness/relevance against the question.
context	Medium (feature)	Text string with additional background information.	Provides deeper semantic understanding.

Table 1. Data Dictionary

METHODOLOGY

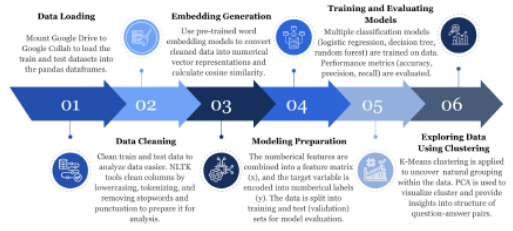


Fig 2. Methodology

MODEL BUILDING & EXPERIMENTAL RESULTS

Rubric

- This table summarizes the performance of various predictive model experiments on different feature sets. It highlights models that generalize well to unseen data, shows where overfitting occurs, and provides insight into the relative effectiveness of embeddings, TF-IDF features, and hybrid approaches.

Features	Predictive Model	Train Accuracy	Test Accuracy
Glove-wiki-gigaword-go to 2 PCAs	Logistic Regression	0.8327	0.8361
Glove-wiki-gigaword-go to 2 PCAs	Decision Tree	1.0000	0.7827
AI MiniLM-L6-v2 embeddings (512 dims) -> scaled -> PCA features -> 2 PCAs for visualization + K-Means	K-Clustering	Silhouette: 0.0399	Silhouette: 0.0399
AI MiniLM-L6-v2 embeddings (512 dims) -> scaled -> PCA features -> 2 PCAs for visualization + Random Forest	Random Forest	1.0000	0.8683
AI MiniLM-L6-v2 embeddings (512 dims) -> scaled -> PCA features -> 2 PCAs for visualization + Naive Network Classifier	Neural Network	0.9498	0.9279
Hybrid TF-IDF + GloVe Features (20) -> scaled -> combined features -> Naive Bayes Classification	Naive Bayes Model	V1: 0.4259 V2: 0.4259 V3: 0.4259	V1: 0.4259 V2: 0.4259 V3: 0.4259
Character-level TF-IDF (4 grams, max 5000 features, derived from preprocessed Q&A)	Multiclass Naive Bayes on Character-Level TF-IDF	0.8900	0.8927
Word-level TF-IDF (4 grams, max 5000 features) from question + answer text	Extra Trees Classifier	0.8922	0.8923

- The Neural Network Model with GloVe embeddings has turned out to be the best model for this data set. This model helped to significantly improve the classification of minorities such as "contradiction" and "irrelevant" compared to other model.

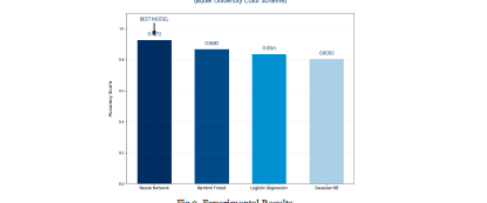


Fig 3. Experimental Results

DEPLOYMENT & LIFECYCLE MANAGEMENT

- Our work acts like a filter for contradictions and irrelevant responses with a 92.7% accuracy. By isolating these failures, we are able to provide clear diagnostics to improve GenAI truthfulness through fine-tuning.
- Our predictions show that context is essential. Analyzing the semantic relationship between questions and answers outperforms models that rely on text isolation.
- The solution serves as a real-time Application Programming Interface that flags regeneration requests when misinformation is detected within educational platforms.



Fig 4. Possible Figure Demonstrating Potential Impact/Savings/Risk Reduction/etc.

KEY TAKE-AWAYS

- What went well:**
- Neural Networks with MiniLM embeddings — strong performance / good generalization.
 - Logistic Regression and TF-IDF — stable and consistent.
 - Character-level TF-IDF + Naive Bayes — surprisingly effective for simpler models.
- What didn't go well/key considerations:**
- Decision Trees — severe overfitting, especially with PCA + GloVe.
 - K-Means — poor clustering (silhouette < 0).
 - High-capacity models risk overfitting: PCA may limit learning of subtle patterns.
 - Feature engineering is critical: naive hybrid approaches can hurt performance.
 - MiniLM embeddings outperform GloVe for semantic tasks.
- Competition Outcome**
- Data Dawgs placed 26th in Region 3 in the Data for Good competition.
 - An invalid Case Challenge file meant no official score was recorded.
 - Ranking reflects participation in other components, not Case Challenge performance.



Personal Development & Outcomes

- Became Microsoft AI-900 AI Fundamentals Certified.
- Completed 5 DataCamp courses on Python Programming, Scikit-learn, Natural Language Processing, and Cluster Analysis.
- Learned the INFORMS Business Problem Framing Course.
- Earned a SAS Badge on SQL Essentials Knowledge.
- Earned a SAS Badge on AI Foundations Knowledge.
- Developed a much greater understanding of Python and AI/ML overall.



Student perceptions – “career readiness”

89%

believed this competition helped fill a knowledge, skill, or ability gap that they could showcase to employers

81%

said they would “probably” or “definitely” discuss this competition work in a future interview to highlight their analytics skills

Student perceptions – “process, process, process”

8%

have heard of the INFORMS CAP JTAs/IAF prior to this competition

80%

perceived knowledge of the INFORMS IAF was moderately to advanced

Note: 17% at beginning of competition

89%

plan on using the INFORMS CAP JTAs in the future when designing and delivering analytical solutions.

Note: 80% last year

Engagement with Business Problem Framing course

Status	Count
Complete!	145
Pending	186
(blank)	15
Grand Total	346



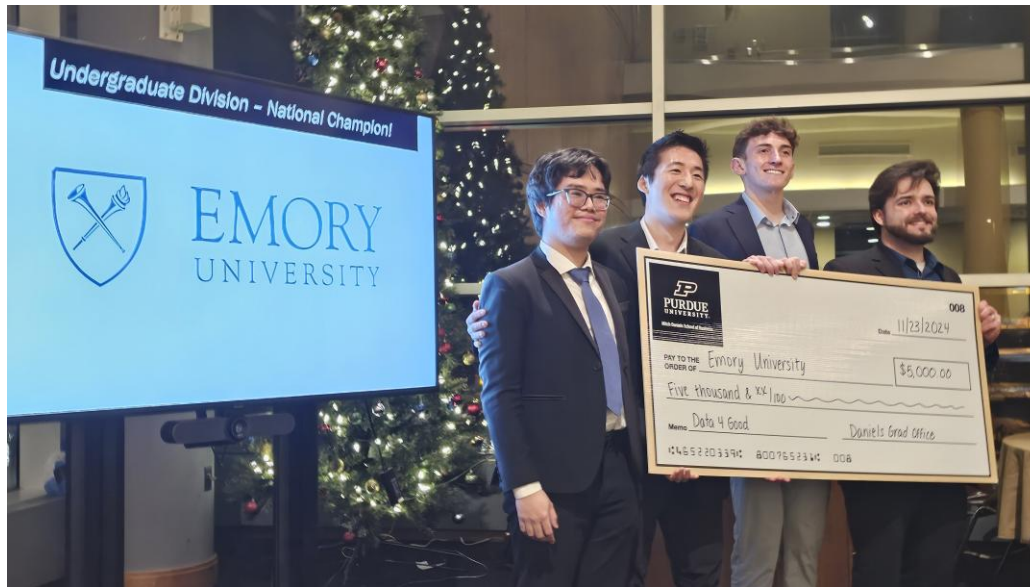
Student perceptions – “process, process, process”

89%

believed this competition was worth the time and money invested

89%

would recommend students to participate in the competition next year!



Mission and vision

Mission: Provide college students **and practitioners** an opportunity to improve their knowledge, skills, and abilities of data analytics for good.

Vision: To be the premier data analytics for good competition in the ~~United States~~ **world**.

Future

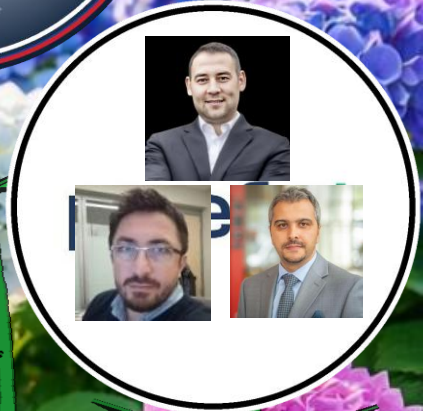
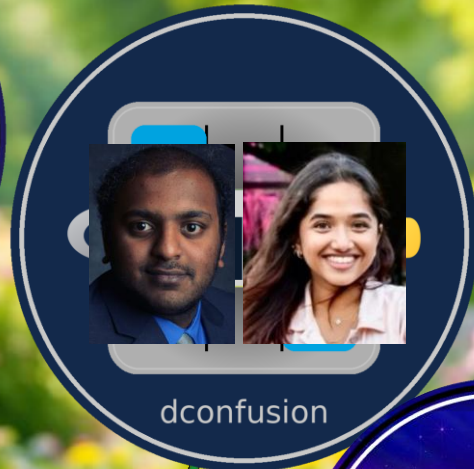
- ✓ More/better student outcomes!
- ✓ Better engagement/promotion/understanding of the benefits of our key analytics community – INFORMS!
- ✓ Provide value for our INFORMS practitioner members – could there be engagement there – maybe different competition tracks/certifications?
 - CAP-E?
 - AI-900 + another partner certification (Andrew coming up with ideas)
- ✓ DataCamp / SAS
 - Continue SAS badge offerings
 - Can we better bridge their platform capabilities
 - Improved real-time scoring leaderboard
 - Better/faster follow up
 - Might bring back quizzes instead of video capturing to award points



Flowers growing in the garden

**As iron sharpens iron, so one person sharpens another
– Proverbs 27:17**





Flowers growing in the garden



BUTLER

LACY SCHOOL
of BUSINESS

BUTLER

A close-up photograph of a person's thumb holding a small, rectangular piece of white paper. The paper has red text printed on it. In the background, a black computer keyboard is visible, slightly out of focus. The paper is held against a dark, textured surface.

YOU ARE HEADING IN
THE RIGHT DIRECTION.
PANDA EXPRESS