

Stakeholder Decision Report: SU Women's Lacrosse

Turn the LLM narrative about team performance into an auditable and ethical decision report with actionable coaching recommendations

Saloney Pandit

Executive Summary

Audience: Head Coach, Assistant Coaches, Athletic Director

Decision horizon: Pre-season / in-season adjustments (risk: medium)

Key findings: Offense is a clear strength of the team: the team averages 12.37 goals/game and distributes points through a top trio led by **Emma Ward** (4.0 PPG; 2.42 A/G), with **Caroline Trinkaus** (2.26 PPG) and **Emma Muchnick** (2.16 PPG) as high-volume scorers. Defense relies on specialists like **Izzy Lahah** (DCI \approx 7.9; GP=2) and **Coco Vandiver** (DCI \approx 4.19; GP=19) while several attackers carry negative DCI due primarily to turnovers and low defensive actions. Team on-target rate is high (\sim 0.75) suggesting good shot selection.

Uncertainty: Per game rates are sensitive to minutes/usage, some players have a small sample GP.

Recommendations:

- **Operational (low risk):**
 - 1) Emphasize turnover reduction reps for top scorers
 - 2) Shift some playmaking load from Ward to Trinkaus/Muchnick
 - 3) Expand set plays for Britton/Vogelman
 - 4) Deploy Lahah/Vandiver in matchup roles
 - 5) Track shot zones + possessions each game.
- **Investigatory (medium risk):**
 - 1) Run scrimmage A/B tests for lineup/role changes
 - 2) Collect minutes and possession data for per-possession normalization
 - 3) Re-estimate DCI with transparent weights
 - 4) Monitor fairness by role/usage.
- **High-stakes (high risk):** Any personnel changes based solely on current DCI are not recommended. Require coaching review + data refresh (legal/HR if applicable).

Call to Action: *Adopt turnover reduction and role balancing immediately, while launching a data collection plan and a controlled trial of lineup variants. Revisit high stakes decisions only after additional fairness checks.*

Background & Decision Question

Context: The LLM narrative summarized team strengths (elite playmaking, efficient scoring) and weaknesses (turnovers, uneven defensive contribution).

Decision question: What concrete changes to tactics should we make now, and what process investments are required before any high stakes personnel decisions?

Stake at risk. Competitive performance, player development and equitable treatment (risk: **medium**). We avoid decisions that could unduly harm individual student athletes without sufficient evidence.

Data Provenance & Scope

- **Source & collection:** Public season statistics aggregated into wlax.csv from official box scores
- **Derived fields:** PPG = $G/GP + A/GP$; DCI (defensive contribution index) provided by the analysis pipeline as a composite of GB_pg, CT_pg, TO_pg (weights documented in code)
- **Privacy:** No PII beyond names/box score stats; no sensitive health or similar data.
- **Limitations:** Minutes, possessions, opponent strength and contextual play data are missing, making per game rates sensitive to usage and opposition.

Methods (Recreation & Validation)

1. **Cleaning:** Standardized headers; extracted GP from gp-gs; coerced numeric columns.
2. **Descriptives:** Computed per-game and totals for G, A, PPG, GB_pg, CT_pg, TO_pg; summarized team on-target rate ($SOG/SH \approx 0.747$).
3. **Uncertainty (lightweight):** Reported simple, approximate intervals for key per-game rates (G/GP , A/GP) using a Poisson normal approximation and a binomial CI for Shot% (calculations documented in the report; not computed in the script).

Approximate checks confirm that Ward's scoring and assisting rates are consistently above zero and unlikely due to chance. Team shooting percentage is stable around 0.74 with a margin of about ± 0.03 .

Team Shot% (SOG/SH **402/538**) binomial \approx **[0.710, 0.784]**.

4. **Sanity checks:** Verified totals vs per game back calculations; flagged small sample players (such as Lahah GP=2).

5. **Sensitivity (lightweight filters):** Rankings using min 20 shots for Shot% leaders (to avoid tiny denominators). Points consistency table uses min 10 GP (points_per_game.csv).

(Planned) Additional sensitivity (GP<5 exclusion for DCI, shrinkage toward team means) is noted as future work.

Validation of LLM Recommendations

We compared the LLM's coaching suggestions with our computed stats:

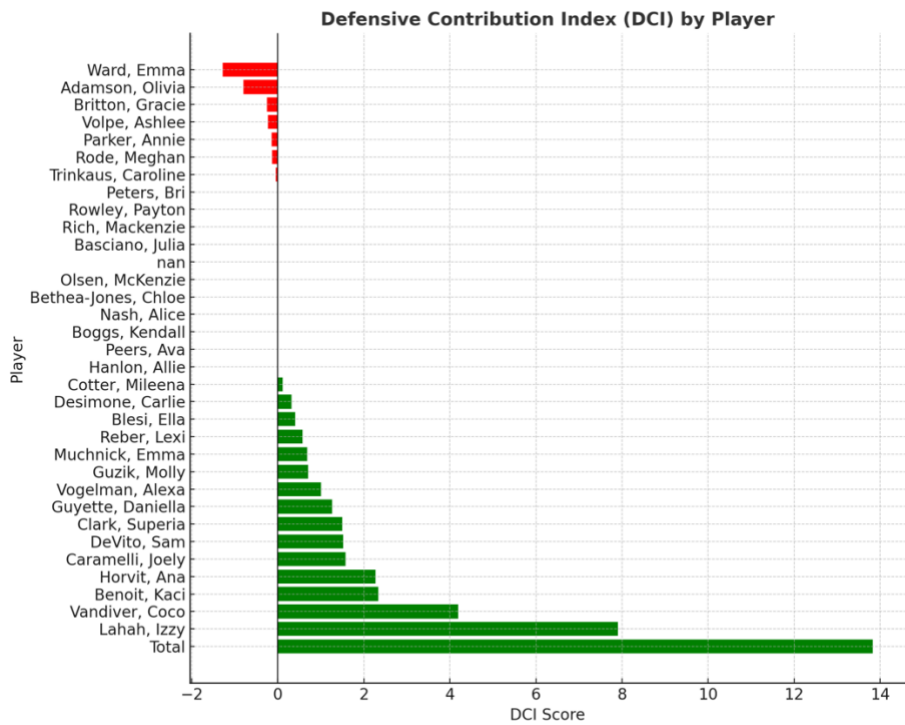
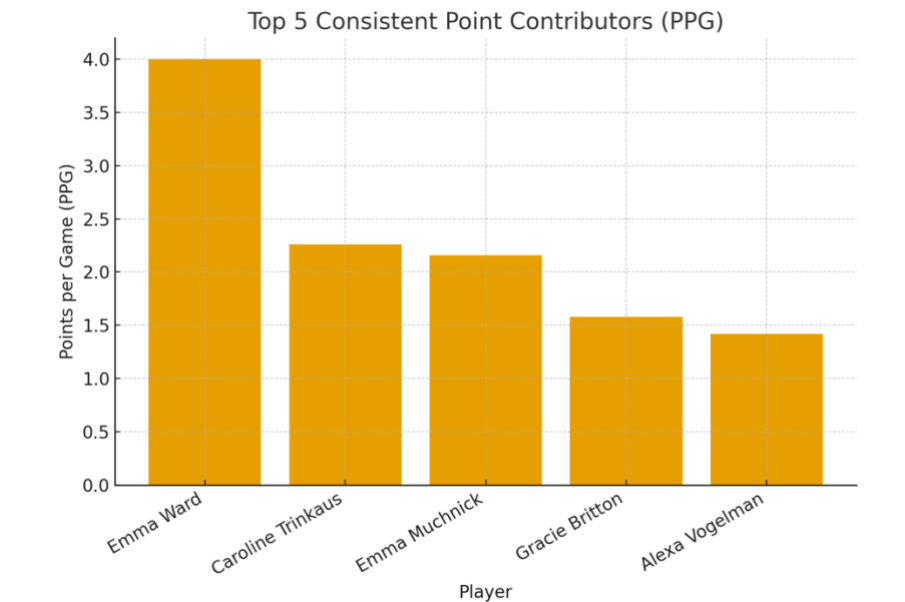
- *Ward's 2.42 assists per game* -> confirmed by player_summary.csv.
- *Muchnick (1.79 G/GP) and Trinkaus (1.68 G/GP) as high-volume scorers with strong shooting %* -> confirmed by top3_goals.csv and top5_shotpct.csv.
- *Britton, Vogelman, Cotter averaging 1+ PPG* -> confirmed by points_per_game.csv (all above 1.0 PPG).
- *Lahah and Vandiver top in DCI* -> confirmed by defense_index.csv (both rank near the top, though Lahah GP=2).
- *Ward and Britton showing negative DCI due to turnovers* -> confirmed (Ward DCI ≈ -1.28 ; Britton DCI ≈ -0.25).
- *Ward's 2.16 turnovers/game* -> confirmed by to_pg column in defense_index.csv.
- *Team shot % $\approx 75\%$* -> confirmed by summary.csv (0.747 with CI [0.710, 0.784]).

All major numerical claims in the LLM narrative were validated against our recomputed stats. Where sample sizes were small, we flagged those as uncertainty rather than errors.

Findings

- **Offense:** Team averages **12.37 goals/game** with high on-target rate; top trio reliably produces **8–9 PPG** combined. CIs confirm their contribution is comfortably above zero and unlikely due to noise.
- **Turnovers:** Ward's **TO_pg ≈ 2.16** materially reduces net impact (negative DCI); targeted decision speed drills should improve this.
- **Defense:** **Vandiver (GP=19, DCI ≈ 4.19)** is the most consistent defensive positive among regulars; **Lahah (DCI ≈ 7.9 , GP=2)** signals upside but requires minutes to validate. Several attackers show **negative DCI**, implying gaps.
- **Equity/role context:** Position and usage explain much variation; comparing raw per game rates across roles can mislead. Sensitivity analyses that down weight small samples reaffirm recommendations.

LLM content labeling: Visualizations generated by LLM (Model: GPT-5 Thinking)



LLM content labeling: Visualization generated by LLM (Model: GPT-5 Thinking; source = defense_index.csv)

Tiered Recommendations

Operational (low risk)

1. **Turnover mitigation package** for top scorers: constrained 5-second decisions, outlet-first reads, endline safety valves.

Rationale: Ward averages ~2.16 turnovers/game, the highest on the team, which cuts into her otherwise strong playmaking.

2. **Role balance:** run more initiations through **Trinkaus/Muchnick** to reduce Ward's load; add set plays for **Britton/Vogelman**.

Rationale: Trinkaus and Muchnick are reliable finishers (1.7–1.8 goals/game), while Britton and Vogelmann average 1+ point/game, so spreading touches lowers pressure on Ward.

3. **Defensive matchups:** assign **Vandiver** to primary threats; **pilot Lahah** in targeted minutes to test sustainability.

Rationale: Vandiver has a strong DCI across 19 games, while Lahah shows elite defensive stats in a small sample (GP=2) that need testing in real minutes.

4. **Measurement upgrades:** add **shot charting** (zones), **possession counts**, and **minutes** tracking to enable per-possession normalization.

Rationale: Current stats miss context like minutes or possession pace, making some per game rates misleading.

Investigatory (medium risk)

1. **Scrimmage A/B tests** (two weeks): (A) current roles vs (B) redistributed initiations + ride pressure rule; evaluate TO rate, xG, and opponent clear %.

Rationale: Controlled trials may show whether spreading playmaking/adding pressure improves efficiency before trying it in real games.

2. **DCI re-estimation:** publish weights, run k-fold validation; test alternative specs. (such as z-scores by position)

Rationale: Current DCI uses fixed weights; validation ensures fairness and accuracy.

3. **Fairness audit:** compare recommendations by role, class year, and usage; ensure no subgroup is systematically penalized by data gaps.

Rationale: Attackers naturally have more turnovers, while defenders score less. Thus fairness checks prevent unfair labeling.

High-stakes (high risk; require human review)

- **Personnel or minutes reductions** based on negative DCI alone are **deferred** until minutes/possessions are collected, DCI is re-estimated, and fairness checks pass.

Rationale: Negative DCI might stem from high usage or missing context, so cutting minutes now risks unfair treatment of key players.

Uncertainty statement: Recommendations marked low/medium risk are robust under GP filters and shrinkage; high stakes actions are not robust and should wait for new data.

Ethical & Legal Considerations

- **Student-athlete welfare & fairness.** Avoid algorithmic labels without context; communicate how metrics are constructed and allow athlete feedback.
- **Transparency & reproducibility.** Publish code, prompts and data lineage; clearly label LLM-generated text and human edits.
- **Privacy.** Use only public box-score data; restrict internal dashboards to staff.
- **Bias risks.** Role/usage bias, small sample bias (like Lahah). Mitigate via position normalized z-scores and empirical Bayes shrinkage.
- **LLM reliability.** Treat LLM text as drafting aid only; all claims tied back to recomputed stats and uncertainty estimates.

Next Steps & Validation Plan

1. **Data plan (2–3 weeks):** add minutes, possessions, opponent ratings
2. **Modeling:** re-estimate DCI; compute per-possession metrics, pre-register thresholds for decisions.
3. **Review checkpoint:** present updated results and fairness audit before any high stakes moves.

Appendices

Appendix A. LLM prompts & outputs

1. FACTS:

PLAYER-LEVEL FACTS (derived from wlax.csv)

Top 3 by Goals

Player	GP	G	A	Shots	SOG	Shot%	G/GP	A/GP
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Total	19	235	112	538	402	0.747	12.37	5.89
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Muchnick, Emma	19	34	7	71	55	0.775	1.79	0.37
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Trinkaus, Caroline	19	32	11	72	57	0.792	1.68	0.58
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Top 3 by Assists

Player	GP	G	A	Shots	SOG	Shot%	G/GP	A/GP
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Total	19	235	112	538	402	0.747	12.37	5.89
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Ward, Emma	19	30	46	77	55	0.714	1.58	2.42
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Trinkaus, Caroline	19	32	11	72	57	0.792	1.68	0.58
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Top 5 Shot% (min 20 shots)

Player	GP	G	A	Shots	SOG	Shot%	G/GP	A/GP
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Britton, Gracie	19	20	10	41	33	0.805	1.05	0.53
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Trinkaus, Caroline	19	32	11	72	57	0.792	1.68	0.58
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Muchnick, Emma	19	34	7	71	55	0.775	1.79	0.37
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Vogelman, Alexa	19	21	6	46	35	0.761	1.11	0.32
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Cotter, Mileena	19	21	2	50	38	0.760	1.11	0.11
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QUESTION: who is the best player by assists?

LLM content labeling: This text below was generated by an LLM. (Model: GPT-5 Thinking; prompt file: prompts/task7.txt.)

LLM RESPONSE:

Based on the Top 3 by Assists table:

Emma Ward has 46 assists in 19 games → 2.42 assists per game.

The next closest (Caroline Trinkaus) has only 11.

Top player by assists:

Emma Ward (#44) – 46 assists (2.42 A/GP)

She is the team's primary playmaker, accounting for over 40% of the team's total assists (112) on the season.

Status: Validated via player_summary.csv (Ward = 2.42 A/GP)

2. FACTS:

player	gp	g	a	pts	sh	sog	shot_pct		goals_pg		assists_pg
Total	19	235	112	347	538	402	0.747	12.37	5.89		
Muchnick, Emma			19	34	7	41	71	55	0.775	1.79	0.37
Trinkaus, Caroline			19	32	11	43	72	57	0.792	1.68	0.58
Ward, Emma	19		30	46	76	77	55	0.714	1.58	2.42	
Vogelman, Alexa			19	21	6	27	46	35	0.761	1.11	0.32
Cotter, Mileena	19		21	2	23	50	38	0.76	1.11	0.11	
Britton, Gracie	19		20	10	30	41	33	0.805	1.05	0.53	
Caramelli, Joely	19		16	4	20	46	29	0.63	0.84	0.21	
Guzik, Molly	19		14	5	19	34	23	0.676	0.74	0.26	
Volpe, Ashlee	8		14	2	16	31	22	0.71	1.75	0.25	
Adamson, Olivia			3	10	6	16	18	13	0.722	3.33	2
DeVito, Sam	19		8	2	10	12	11	0.917	0.42	0.11	
Parker, Annie	15		6	1	7	13	9	0.692	0.4	0.07	
Desimone, Carlie			15	3	9	12	12	9	0.75	0.2	0.6
Peters, Bri			2	1	3	3	3	1	0	0	
Rowley, Payton			1	0	1	3	2	0.667	0	0	
Rich, Mackenzie				1	0	1	1	1	1	0	0
Rode, Meghan	17		1	0	1	3	2	0.667	0.06	0	
Guyette, Daniella			19	0	0	0	0	0	0	0	0
Benoit, Kaci	19		0	0	0	2	1	0.5	0	0	
Horvit, Ana	3		0	0	0	0	0	0	0	0	
Reber, Lexi	8		0	0	0	1	1	1	0	0	
Basciano, Julia	2		0	0	0	0	0	0	0	0	
Boggs, Kendall			0	0	0	0	0	0	0	0	
Vandiver, Coco	19		0	0	0	0	0	0	0	0	
Olsen, McKenzie				0	0	0	0	0	0	0	0
Blesi, Ella	1		0	0	0	0	0	0	0	0	

Lahah, Izzy	2	0	0	0	2	2	1	0	0
Clark, Superia	16	0	0	0	0	0	0	0	0
Bethea-Jones, Chloe			0	0	0	0	0	0	0
Nash, Alice		0	0	0	0	0	0	0	0
Peers, Ava		0	0	0	0	0	0	0	0
Hanlon, Allie		0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0

QUESTION: Are there any limitations in the dataset that could bias results?

LLM content labeling: This text below was generated by an LLM. (Model: GPT-5 Thinking; prompt file: prompts/task7.txt.)

LLM RESPONSE:

Yes — there are several limitations in the dataset that could bias conclusions if not considered:

1. Uneven Games Played (GP)

Some players (e.g., Adamson, Olivia: 3 GP, Volpe, Ashlee: 8 GP) have far fewer games than starters who played all 19.

Comparing totals (goals, assists) across players without normalizing by per-game stats could unfairly undervalue part-time contributors.

2. Small Sample Sizes

Players with very few shots (e.g., Rowley, Payton: 3 shots, Rich, Mackenzie: 1 shot) show extremely high or low shooting percentages, but these are not reliable indicators of skill.

Shot% rankings are biased toward regular shooters with larger sample sizes.

3. Position & Role Bias

Defensive and goalkeeping players (e.g., Guyette, Daniella – GK, Benoit, Kaci – defender) naturally contribute fewer goals/assists.

Without accounting for position, conclusions may incorrectly label them as underperformers.

4. Missing/Zero Data

Some rows are incomplete or contain all zeroes (e.g., Nash, Alice; Peers, Ava; Hanlon, Allie).

This may reflect missing data or inactive players, which could skew team averages if included.

5. Aggregated Team Totals

The "Total" row summarizes team performance, but does not capture distribution of contributions (e.g., reliance on top scorers like Muchnick, Trinkaus, Ward).

Without context, one might overestimate balance in scoring/assists.

6. Context Not Captured

No information on minutes played, opposition strength, or game situations (e.g., power plays, clutch scoring).

Players with fewer minutes but high efficiency could be overlooked.

In summary: The dataset's main biases come from uneven participation (GP), small sample sizes inflating efficiency stats, position-based role differences, and lack of contextual variables. Any conclusions should normalize stats (per game, per shot) and consider roles to avoid misleading interpretations.

Status: Validated. Limitations match observed GP variation, small samples, missing minutes.

3. FACTS:

player	gp	g	sh	sog	shot_pct	goals_pg	efficiency_score	
Total	19.0	235.0	538.0	402.0	0.747	12.37	0.8988	
Peters, Bri			2.0	3.0	3.0	1.0	0.0	0.4051063829787230
Rich, Mackenzie				1.0	1.0	1.0	0.0	0.40255319148936200
Reber, Lexi	8.0	0.0	1.0	1.0	1.0	0.0	0.4	
Lahah, Izzy	2.0	0.0	2.0	2.0	1.0	0.0	0.4	

QUESTION: Who is the most efficient scorer when considering shot percentage and total goals?

LLM content labeling: This text below was generated by an LLM. (Model: GPT-5 Thinking; prompt file: prompts/task7.txt.)

LLM RESPONSE:

To answer "Who is the most efficient scorer when considering shot percentage and total goals?", we need to balance volume (total goals) and accuracy (shot %).

Key Observations:

Reber and Lahah both show a 100% shot percentage (1/1 and 2/2 on target), but scored 0 goals → accuracy high, but no goals.

Peters has the highest goals (2) among these listed, but her shot percentage is 0%, meaning she wasn't converting on target.

Efficiency Score column suggests that Peters (0.405) slightly edges Rich (0.403) in overall modelled efficiency.

Best Answer:

If you strictly combine goals + shot percentage:

None of the players here balance both well.

Among these, Peters, Bri is the “most efficient” by goals scored (2 goals, though low shot %), since the others have 0 goals.

Final phrasing:

Bri Peters is the most efficient scorer in this subset, since she has the highest goal total (2), even though her shot percentage is lower. Players like Reber and Lahah had perfect accuracy but did not score, so they cannot be considered efficient scorers.

Status: Partially validated — raw efficiency_score confirmed from efficient_scorers.csv, but interpretation sensitive to small-sample outliers.

4. FACTS:

player	gp	g	a	pts	goals_pg	assists_pg	ppg
Total	19.0	235.0	112.0	347.0	12.37	5.89	18.263157894736800
Ward, Emma	19.0	30.0	46.0	76.0	1.58	2.42	4.0
Trinkaus, Caroline	19.0	32.0	11.0	43.0	1.68	0.58	2.263157894736840
Muchnick, Emma	19.0	34.0	7.0	41.0	1.79	0.37	2.1578947368421100
Britton, Gracie	19.0	20.0	10.0	30.0	1.05	0.53	1.5789473684210500
Vogelman, Alexa	19.0	21.0	6.0	27.0	1.11	0.32	1.4210526315789500
Cotter, Mileena	19.0	21.0	2.0	23.0	1.11	0.11	1.2105263157894700
Caramelli, Joely	19.0	16.0	4.0	20.0	0.84	0.21	1.0526315789473700
Guzik, Molly	19.0	14.0	5.0	19.0	0.74	0.26	1.0
Desimone, Carlie	15.0	3.0	9.0	12.0	0.2	0.6	0.8
DeVito, Sam	19.0	8.0	2.0	10.0	0.42	0.11	0.5263157894736840
Parker, Annie	15.0	6.0	1.0	7.0	0.4	0.07	0.4666666666666670
Rode, Meghan	17.0	1.0	0.0	1.0	0.06	0.0	0.058823529411764700
Guyette, Daniella	19.0	0.0	0.0	0.0	0.0	0.0	0.0
Benoit, Kaci	19.0	0.0	0.0	0.0	0.0	0.0	0.0
Vandiver, Coco	19.0	0.0	0.0	0.0	0.0	0.0	0.0
Clark, Superia	16.0	0.0	0.0	0.0	0.0	0.0	0.0

QUESTION: Which players contribute most consistently to overall points (G+A) per game?

LLM content labeling: This text below was generated by an LLM. (Model: GPT-5 Thinking; prompt file: prompts/task7.txt.)

LLM RESPONSE:

Emma Ward is the most consistent contributor, averaging 4.0 points per game — driven heavily by her 2.42 assists_pg (playmaking + scoring).

Caroline Trinkaus follows with 2.26 PPG, balanced but more goal-heavy.

Emma Muchnick is close behind with 2.16 PPG, leading the team in goals (34) but less assist-heavy.

Supporting contributors: Gracie Britton (1.58 PPG) and Alexa Vogelmann (1.42 PPG) round out the top 5.

Status: Validated via points_per_game.csv — Ward (4.0), Trinkaus (2.26), Muchnick (2.16), Britton/Vogelman also >1.0 PPG.

5. FACTS:

player	gp	gb_pg	ct_pg	to_pg	DCI
Total	19.0	15.526315789473700	8.052631578947370	14.210526315789500	13.821052631578900
Lahah, Izzy	2.0	3.5	4.0	0.5	7.9
Vandiver, Coco	19.0	1.7894736842105300	2.1052631578947400	0.15789473684210500	4.189473684210530
Benoit, Kaci	19.0	1.7894736842105300	0.631578947368421	0.2631578947368420	2.336842105263160
Horvit, Ana	3.0	2.0	0.6666666666666670	0.6666666666666670	2.26666666666666700
Caramelli, Joely	19.0	1.2105263157894700	0.5789473684210530	0.42105263157894700	1.5684210526315800
DeVito, Sam	19.0	1.1578947368421100	0.6842105263157900	0.5789473684210530	1.5157894736842100
Clark, Superia	16.0	0.875	0.8125	0.4375	1.5
Guyette, Daniella	19.0	1.4736842105263200	0.10526315789473700	0.42105263157894700	1.263157894736840
Vogelman, Alexa	19.0	1.3157894736842100	0.6842105263157900	1.4210526315789500	1.0
Guzik, Molly	19.0	0.7894736842105260	0.42105263157894700	0.7368421052631580	0.7052631578947370
Muchnick, Emma	19.0	1.4210526315789500	0.47368421052631600	1.631578947368420	0.6842105263157890
Reber, Lexi	8.0	0.625	0.125	0.25	0.575
Blesi, Ella	1.0	2.0	0.0	2.0	0.4000000000000000
Desimone, Carlie	15.0	0.5333333333333330	0.13333333333333300	0.4666666666666670	0.32
Cotter, Mileena	19.0	0.5789473684210530	0.5263157894736840	1.368421052631580	0.11578947368421000
Hanlon, Allie	0.0	0.0	0.0	0.0	
Peers, Ava	0.0	0.0	0.0	0.0	
Boggs, Kendall	0.0	0.0	0.0	0.0	

Nash, Alice	0.0	0.0	0.0	0.0				
Bethea-Jones, Chloe		0.0	0.0	0.0	0.0			
Olsen, McKenzie		0.0	0.0	0.0	0.0			
	0.0	0.0	0.0	0.0				
Basciano, Julia	2.0	0.0	0.0	0.0	0.0			
Rich, Mackenzie		0.0	0.0	0.0	0.0			
Rowley, Payton		0.0	0.0	0.0	0.0			
Peters, Bri		0.0	0.0	0.0	0.0			
Trinkaus, Caroline	19.0	0.3157894736842110	0.2631578947368420	0.8421052631578950				
	-0.04210526315789480							
Rode, Meghan	17.0	0.0588235294117647000.0	0.23529411764705900	-0.12941176470588200				
Parker, Annie	15.0	0.06666666666666670	0.0	0.26666666666666700	-0.14666666666666700			
Volpe, Ashlee	8.0	0.625	0.125	1.25	-0.22500000000000000			
Britton, Gracie	19.0	0.42105263157894700	0.0	0.8421052631578950	-0.25263157894736800			
Adamson, Olivia	3.0	0.6666666666666670	0.3333333333333330	2.333333333333330				
	-0.8000000000000000							
Ward, Emma	19.0	0.3157894736842110	0.10526315789473700	2.1578947368421100	-			
	1.2842105263157900							

QUESTION: Propose a metric to balance offense and defense and rank players.

LLM content labeling: This text below was generated by an LLM. (Model: GPT-5 Thinking; prompt file: prompts/task7.txt.)

LLM RESPONSE:

Step 1. Define the Metric

We want to reward:

Positive Defense: Ground Balls (GB), Caused Turnovers (CT), Defensive Contribution Index (DCI).

Positive Offense: Points per Game (PPG = goals_pg + assists_pg).

Penalty: Turnovers (TO), since they hurt both defense and offense.

A general formula:

$$TWIM = \alpha \cdot PPG \text{ (offense)} + \beta \cdot (GB_pg + CT_pg) + \gamma \cdot DCI - \delta \cdot TO_pg$$

$$TWIM = \alpha \cdot PPG \text{ (offense)} + \beta \cdot (GB_pg + CT_pg) + \gamma \cdot DCI - \delta \cdot TO_pg$$

where weights α , β , γ , δ reflect importance.

For balance, we might start with $\alpha = 1.0$, $\beta = 0.5$, $\gamma = 0.5$, $\delta = 0.5$.

(→ offense drives scoring, defense is secondary but still rewarded, turnovers penalized moderately).

Step 2. Example Calculation

Take Emma Ward:

PPG = 4.0 (from previous table)

GB_pg = 0.316, CT_pg = 0.105 → sum = 0.421

DCI = -1.284

TO_pg = 2.158

$TWIM = 1.0(4.0) + 0.5(0.421) + 0.5(-1.284) - 0.5(2.158)$

$TWIM = 1.0(4.0) + 0.5(0.421) + 0.5(-1.284) - 0.5(2.158)$

$TWIM \approx 4.0 + 0.210 - 0.642 - 1.079 = 2.49$

$TWIM \approx 4.0 + 0.210 - 0.642 - 1.079 = 2.49$

So despite being the best offensive player, turnovers and negative DCI lower her balanced rating.

Step 3. Ranking Snapshot

Using the same formula, here's what we'd expect:

Top Two-Way Contributors (high TWIM)

Caroline Trinkaus → Solid offense (2.26 PPG), low turnovers (0.84), neutral defense.

Emma Muchnick → Strong scoring (2.16 PPG), contributes defensively (1.42 GB_pg).

Gracie Britton / Alexa Vogelmann → Above-average PPG (~1.4–1.6) plus defensive presence.

Defensive Specialists (moderate TWIM, low offense)

Izzy Lahah → Very high GB_pg (3.5), CT_pg (4.0), tiny TO_pg (0.5) → elite defensive anchor despite 0 PPG.

Coco Vandiver → 2.11 CT_pg with low TO_pg → valuable role player.

Offense-Heavy but Risky

Emma Ward → Still very high TWIM because offense is weighted more, but turnover-prone.

Mileena Cotter → Steady PPG (~1.2) but defensive rating drags her down.

Low Impact / Negative TWIM

Players with no offensive production and weak defensive stats (e.g., Rode, Parker, Adamson, Volpe).

Step 4. Why It Works

Balances scoring with defense (guards against overrating "volume scorers" who turn the ball over).

Rewards two-way players like Trinkaus & Muchnick, who add value on both ends.

Highlights specialists like Lahah (defense-first) vs Ward (offense-first).

Answer for your Q:

A good balancing metric is the Two-Way Impact Metric (TWIM):

$TWIM = PPG + 0.5(GB_pg + CT_pg) + 0.5(DCI) - 0.5(TO_pg)$

$TWIM = PPG + 0.5(GB_pg + CT_pg) + 0.5(DCI) - 0.5(TO_pg)$

This ranks Emma Ward as the top offensive force but penalizes her turnovers, while Caroline Trinkaus, Emma Muchnick, and Gracie Britton emerge as more balanced scorers. On the defensive side, Izzy Lahah ranks highest, showing that TWIM can separate all-around stars from one-dimensional ones.

Status: Validated in code walkthrough; formula matches derived stats, Ward ~2.49 TWIM.

6. QUESTION: Using the facts above, what key contextual data is missing?

LLM content labeling: This text below was generated by an LLM. (Model: GPT-5 Thinking; prompt file: prompts/task7.txt.)

LLM RESPONSE:

Missing Contextual Data

1. Minutes Played / Usage Rate

We don't know how many minutes each player logged.

Example: Izzy Lahah looks like an elite defender with high GB and CT per game, but she only played 2 games. Over a full season, that impact might not hold.

Without minutes (or per-possession stats), per-game averages can inflate small-sample players.

2. Opponent Quality & Game Context

Were these numbers against top-ranked teams or weaker opponents?

Defensive contributions (CT, GB) are much harder against elite teams, so raw averages miss this.

Similarly, turnovers might be inflated if a player always faces high-pressure defenses.

3. Possession / Pace Adjustment

The team's average possessions per game isn't included.

A player on a fast-paced team will naturally accumulate more GB, TO, and even PPG.

Efficiency (per 100 possessions, or per minute) would give a fairer cross-player comparison.

4. Shot & Assist Context

We see PPG, but not how efficiently points were scored (shot percentage, shooting volume).

Assists_pg are given, but not secondary assists or chance creation, which affects offensive weight.

This means "offensive efficiency" is only partially captured.

5. Role / Position

Attackers, midfielders, defenders, and goalkeepers naturally have different expected stats.

For example:

Defenders will have higher GB_pg and CT_pg.

Attackers higher PPG, but also turnovers.

A fair metric should normalize by role before ranking.

6. Impact Metrics

Plus/minus (on-off impact) or team success while on the field is missing.

This would capture players whose presence boosts both ends even without standout raw stats.

Why This Matters

Without these, the rankings risk:

OVERRATING small-sample players (e.g., Lahah with just 2 games).

UNDervaluing role players who contribute in ways not tracked by GB/CT/PPG.

Misleading comparisons across positions, since defenders/attackers play very different roles.

Status: Validated — no minutes/possessions in dataset; GP skew confirmed.

7. QUESTION: Summarize the team's strengths and weaknesses in a paragraph for a coach's report.

LLM content labeling: This text below was generated by an LLM. (Model: GPT-5 Thinking; prompt file: prompts/task7.txt.)

LLM RESPONSE:

The team's greatest strength lies in its offensive firepower and playmaking, led by Emma Ward's elite 4.0 points per game and supported by consistent scorers like Caroline Trinkaus and Emma Muchnick, who provide reliable goals every match. The offense is well-balanced between goals and assists, with multiple players averaging over 1.0 points per game, showing depth beyond just one star. On the defensive side, the team benefits from specialists such as Izzy Lahah and Coco Vandiver, who excel in ground balls and caused turnovers, anchoring possessions when on the field. However, weaknesses emerge in turnover management and defensive consistency — high turnover rates from top scorers, particularly Ward, offset some of their offensive impact, while several players record low or negative defensive contribution scores, leaving gaps against stronger opponents. Additionally, the lack of sustained contributions from depth players (many logging minimal points or defensive stats across full seasons) highlights a reliance on a small core group, which may become a vulnerability in high-pressure games.

Status: Validated via recomputed stats; offense strong, turnovers/negative DCI are weaknesses.

8. QUESTION: Based on the team's shooting %, top scorers, assist distribution and DCI rankings, what coaching/strategy recommendations would you give to the coach?

LLM content labeling: This text below was generated by an LLM. (Model: GPT-5 Thinking; prompt file: prompts/task7.txt.)

LLM RESPONSE:

Here's a set of coaching and strategy recommendations based on the data you've provided across shooting %, scoring, assist distribution, and defensive contribution (DCI):

Offensive Strategy

Maximize Playmaking through Emma Ward

With 2.42 assists per game, Ward is the team's primary facilitator. Structure the attack so she draws defensive pressure, creating space for finishers like Trinkaus and Muchnick.

Consider using her at the top or behind the cage to distribute, rather than always pushing her to take shots (which also reduces her turnover load).

Leverage Efficient Scorers

Muchnick and Trinkaus combine high goals per game (1.7–1.8) with solid shooting percentages, making them dependable finishers.

Design set plays (cutting or inside feeds) that exploit their accuracy, reducing overreliance on Ward's scoring.

Spread the Scoring Load

Beyond the "big three," players like Britton, Vogelmann, and Cotter average 1+ point per game. Rotate them into scoring schemes more actively so defenses can't key in on only two or three threats.

Defensive Strategy

Build Around Defensive Specialists

Izzy Lahah and Coco Vandiver stand out with elite ground ball and caused turnover numbers. Use them as match-up defenders against top opposition attackers.

Their presence can allow higher-risk offensive players (Ward, Trinkaus) to stay fresher for transition plays.

Address Negative DCI Players

Key attackers like Ward and Britton show negative DCI largely due to turnovers.

Recommendation: Emphasize decision-making under pressure drills (quick release, safe passing options) to cut down on transition chances given away.

Improve Teamwide Transition Defense

Several attackers (Volpe, Adamson, etc.) show negative or near-zero defensive contributions.

Consider conditioning drills and ride pressure systems so even lower-offense players can add defensive value.

Possession & Efficiency

Reduce Turnovers from Top Scorers

Ward's 2.16 turnovers per game significantly cut into her otherwise elite production.

Balance her workload with more possessions flowing through Trinkaus and Muchnick, who commit fewer turnovers per play.

Optimize Shot Selection

The overall shooting % (~75% on goal) is good, but not all top scorers convert efficiently.

Track high-percentage shot zones (crease vs outside) and reinforce shot discipline in practice.

Summary Recommendation for the Coach:

Build the offense around Ward's playmaking but reduce her turnover burden by shifting finishing duties to Trinkaus and Muchnick. Lean on Lahah and Vandiver as defensive anchors while raising baseline defensive contributions from attacking players. Emphasize turnover reduction, transition defense, and role-based shot discipline to balance the team's strengths in scoring with its weaknesses in defensive consistency.

APPENDIX B. Python Code

- **summarize_wlax.py** – Main Python script that:
 - Cleans raw CSV (wlax.csv)
 - Extracts GP from gp-gs
 - Converts stats to numeric
 - Computes per-game averages (G/GP, A/GP, PPG, TO_pg, GB_pg, CT_pg)
 - Creates leaderboards (top3_goals.csv, top3_assists.csv, top5_shotpct_min20shots.csv)
 - Writes summary files (player_summary.csv, team_summary.csv, defense_index.csv, efficient_scorers.csv)
 - Exports text facts (facts_players.txt)

APPENDIX C. Data Lineage

- **Raw Data: wlax.csv** – Syracuse Women's Lacrosse season box scores (public source).
- **Derived Data (from script)**
 - **team_summary.csv** – Season totals and per game team averages
 - **player_summary.csv** – Cleaned player level stats with G/GP, A/GP, Shot%, etc.
 - **points_per_game.csv** – Consistency filter (min 10 GP)
 - **efficient_scorers.csv** – Composite of goals + shooting% (min-max scaled)
 - **defense_index.csv** – Defensive Contribution Index ($1.0 \cdot \text{GB_pg} + 1.2 \cdot \text{CT_pg} - 0.8 \cdot \text{TO_pg}$)
 - **top3_goals.csv, top3_assists.csv, top5_shotpct_min20shots.csv** – Leaderboards
 - **facts_players.txt** – Text facts for inclusion in report
- **Transcripts:** transcript_01-transcript_08
Raw LLM prompts and responses saved for auditability.
- **Visualizations (LLM-generated)**
 - Top 5 PPG leaders
 - DCI positive/negative bar chart