Faculty Technology Evolution: 2018-2024
Analysis of Technology Adoption Patterns and Strategic Implications

1. Data Preparation

To analyze faculty technology evolution, we processed MISO survey data from 2018 and 2024 using Python and Pandas:

- **Selected relevant variables**: Technology usage, importance ratings, satisfaction scores, demographics, teaching preferences, and skill assessments manually.
- **Standardized metrics**: Normalized all usage metrics on a 1-5 scale and created derived metrics for growth rates and gaps.
- **Organized demographic data**: Categorized by age groups, tenure status, and academic divisions.
- **Integrated datasets**: Merged 2018 and 2024 data after addressing missing values, particularly in tenure-level technology data.
- **Created analysis foundation**: Structured data to support exploration of demographic trends, technology importance/satisfaction, skills/learning interest, adoption patterns, and recommendations.

2. Exploratory Data Analysis

Our exploratory analysis examined patterns across five key themes:

Demographic Analysis

- Compared technology usage across age groups (2018 vs. 2024), revealing convergence over time.
- Found 75.4% of faculty prefer in-person teaching despite high technology adoption.
- Discovered Arts & Humanities leads in CMS usage (4.92) compared to other divisions.

Technology Importance and Satisfaction

- Mapped technologies on importance-satisfaction matrices, showing web conferencing migration to "high importance/satisfaction."
- Identified growth leaders: web conferencing (+43%) and Canvas LMS (+19%)
- Found 84.4% of faculty favor live instruction regardless of modality.
- Noted consistently high service quality ratings (≈4/5) across all support staff types.

Skills and Learning Interest

- Identified consistent pattern where skills exceed interest across all technologies.
- Found highest proficiency in Canvas LMS (3.8) and Web Conferencing (3.6)
- Noted near-universal smartphone adoption (99.4%) with gaps in laptop access (84%)

Technology Trends

- Identified pandemic period (2020) as clear adoption inflection point.
- Categorized technologies as Core Growth, Emerging, Legacy, or Sunset
- Projected AI tools to overtake ERP systems by 2025.

Visualization Techniques

- Used comparative bar charts, quadrant plots, time series visualizations, radar charts, and heatmaps to examine relationships between variables.

3. Identification of a Central Insight

Our central insight integrates findings across all five themes:

Central Insight: *The 2018-2024 period represents a transformation in faculty technology adoption, characterized by demographic convergence, pandemic acceleration, and the emergence of AI as the next frontier, all while faculty maintain preference for traditional teaching approaches.*

Key supporting analyses:

- Statistical tests confirmed the disappearance of age-based differences in technology usage by 2024.
- Time series analysis verified the pandemic as an acceleration catalyst.
- Projection modeling identified AI tools as having the steepest growth trajectory.
- Technology adoption has soared while teaching preferences remain firmly traditional tools acquired but values unchanged.

4. Narrative Development

Our data story development focused on transforming the key findings from our exploratory analysis into a compelling narrative about faculty technology evolution. We structured our approach around five interconnected storylines:

The Narrowing Digital Divide

We developed this narrative by:

- Contrasting the 2018 data showing significant age-based differences in technology usage with 2024 data revealing near-identical adoption patterns
- Using paired visualizations to dramatically illustrate how LMS usage among 60–69-year-olds increased from 3.7 to 4.8, matching younger faculty.
- Creating a storyline that challenges traditional assumptions about older faculty being technology resistant.
- Highlighting how this convergence represents a major cultural shift in academia.

Technology Perception Evolution

We crafted this narrative thread by:

- Tracking the migration of technologies across importance-satisfaction matrices between 2018 and 2024
- Creating a "technology journey" visualization showing how web conferencing transformed from "low importance" to "essential."
- Developing a storyline about how faculty perceptions evolved alongside their usage patterns.
- Connecting these shifts to larger contextual factors, particularly the pandemic's catalytic effect

The Skills-Interest Paradox

We constructed this narrative element by:

- Visualizing the consistent pattern where faculty technical skills exceed learning interest across all technologies.
- Developing a storyline around the "plateau effect" in technology training motivation
- Creating visual comparisons between 2018 (when skills and interest were more aligned) and 2024 (showing significant gaps)
- Exploring implications for how professional development needs to evolve beyond tool-focused training.

Teaching Modality Persistence

We developed this narrative component by:

- Creating visualizations that juxtapose high technology adoption with strong preferences for traditional teaching approaches.
- Crafting a storyline about technology enhancing rather than replacing valued teaching practices
- Using direct faculty feedback quotes to humanize the statistical findings.
- Developing a "technology integration" framework that respects pedagogical preferences.

The AI Trajectory

We shaped this forward-looking narrative by:

- Creating projection visualizations showing AI tools' growth since 2022 and anticipated trajectory through 2025
- Developing a storyline about the next frontier in faculty technology evolution
- Comparing AI adoption patterns to historical technology adoption cycles
- Constructing strategic planning scenarios based on the projected growth curves.

For each narrative component, we mapped out key data points, identified emotional hooks, and designed visualizations that would effectively communicate the story. We then integrated these components into a cohesive overarching narrative about how faculty technology adoption has evolved dramatically while core teaching values have remained consistent.

Recommendations & Implementation Plan

Strategic Priorities:

1. **Expand AI Use**: Support classroom-focused AI adoption that aligns with traditional teaching.
2. **Modernize Legacy Systems**: Redesign or retire ERP and VPN tools with declining value.
3. **Enhance Core Tools**: Invest in CMS and web conferencing features that support preferred teaching styles.

Phased Plan:

- **0–3 months**: Run division-level audits; form AI Taskforce
- **3–9 months**: Pilot AI tools; assess legacy system options
- **9–18 months**: Scale best practices; launch ongoing feedback loops.

5. Visualization

We designed visualizations for each narrative theme:

Demographic Visualizations

- **Age-Based Technology Adoption (2018 vs. 2024)**: Dual-panel bar chart showing convergence across age groups.
- **Teaching Modality Distribution**: Bar chart showing in-person teaching preference despite technology adoption.

Technology Importance and Satisfaction Visualizations

- **Importance-Satisfaction Matrix**: Quadrant plots showing technology migration between 2018 and 2024.
- **Service Quality Radar**: Showing consistently high support quality across staff types.

Skills and Learning Interest Visualizations

- **Skill vs. Learning Interest Gap**: Paired bar chart showing skills exceeding interest.
- **Device Ownership**: Highlighting smartphone adoption alongside laptop gaps

Technology Trends Visualizations

- **Adoption Trends (2018-2025)**: Line chart showing pandemic inflection and projected AI growth.
- **Strategic Technology Quadrant**: Four-quadrant plot for strategic categorization

6. Summary

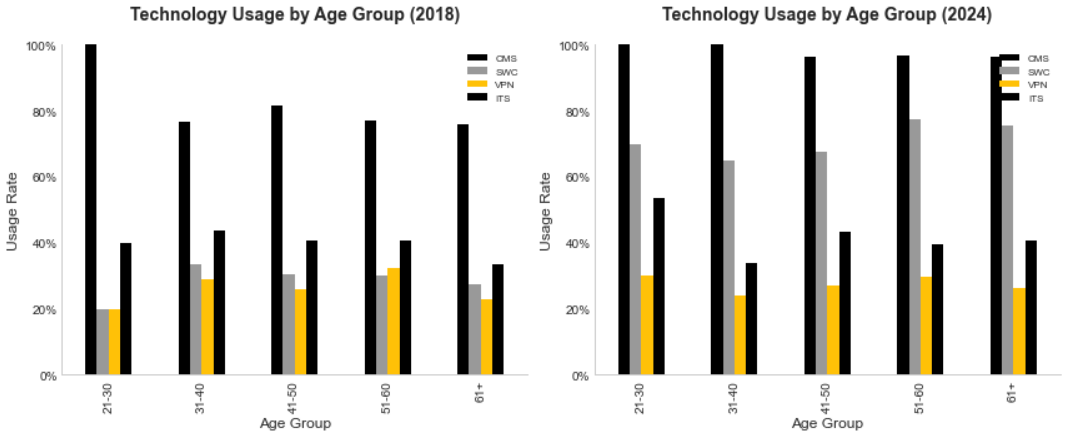
Our analysis of faculty technology evolution from 2018 to 2024 uncovered these significant findings:

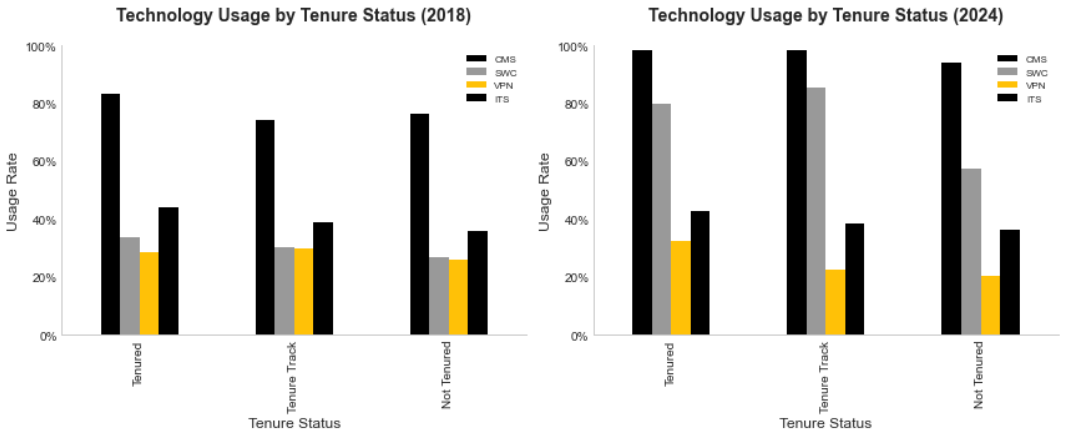
1. **Converging Technology Competency**: By 2024, the technology gap across faculty demographics had essentially vanished, with similar adoption patterns spanning all age groups and tenure statuses.
2. **Pandemic's Transformative Impact**: The 2020 pandemic functioned as a decisive turning point, dramatically accelerating technology adoption and compressing years of expected gradual change into a condensed timeframe.
3. **Tools Adopted, Values Preserved**: Despite widespread technology adoption, faculty maintain strong preferences for traditional teaching methods—revealing that while digital competency increased, fundamental teaching philosophies remained largely unchanged.
4. **Beyond Technical Mastery**: Faculty have developed strong technical skills but show diminishing interest in further tool-centric training, indicating that future development should focus on pedagogical implementation rather than technical features.
5. **AI's Emerging Prominence**: With 40% growth since 2022 and projections to surpass conventional administrative systems by 2025, AI tools represent the next significant phase in educational technology evolution.

These findings suggest that institutions should shift their focus from driving additional technology adoption to helping faculty effectively integrate digital tools with their preferred teaching methods. Treating technology as a teaching aid, not a replacement, helps institutions support faculty preferences while preparing for AI’s growing role in education.

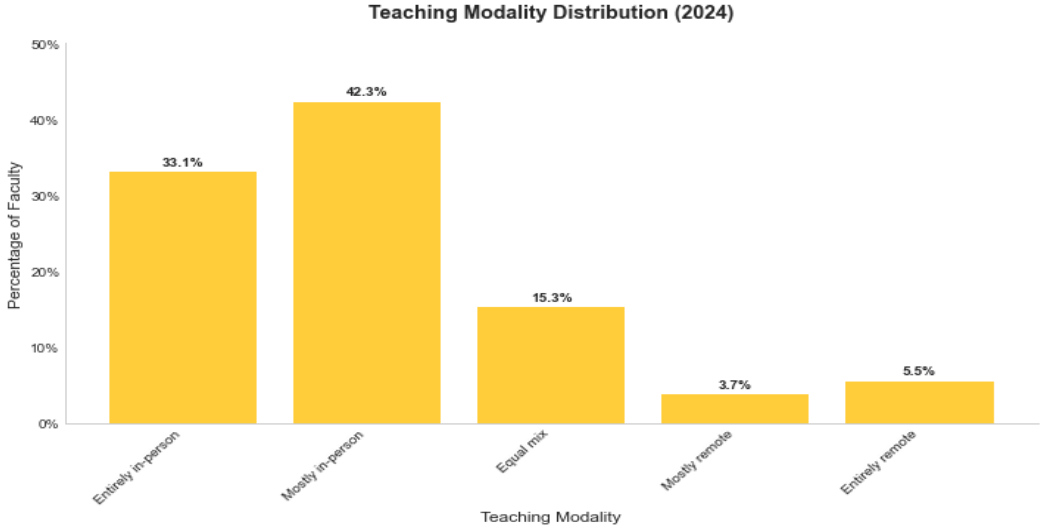
Appendix

1. Age-Based Technology Usage Trends (LMS & CMS)

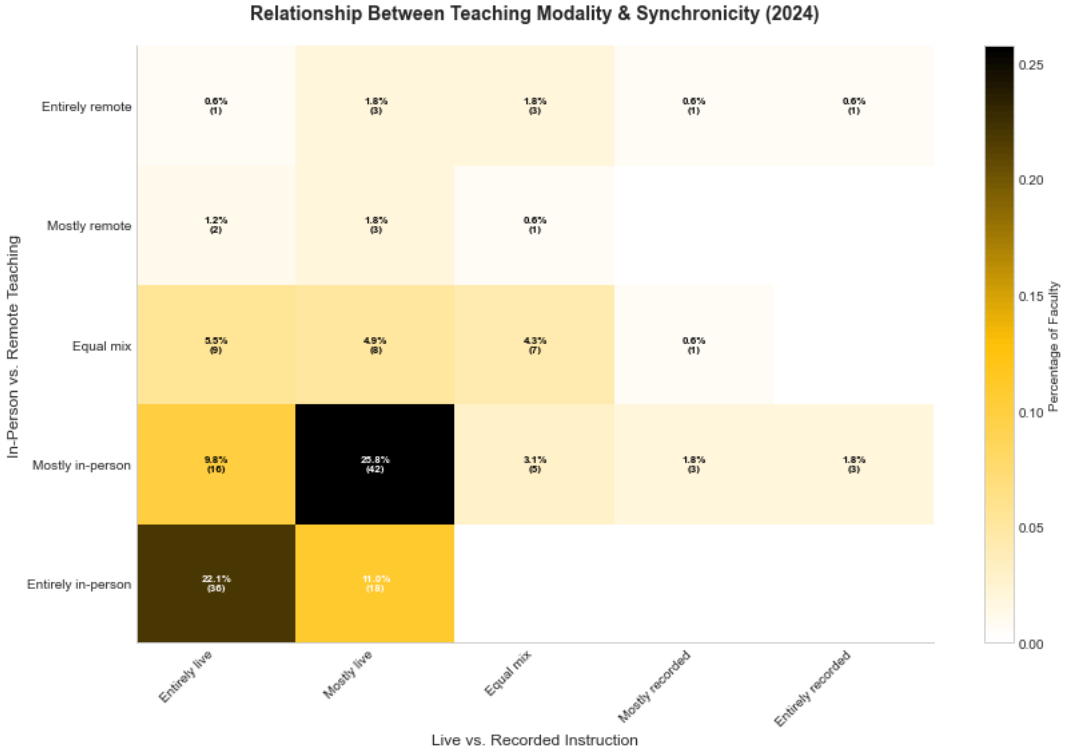




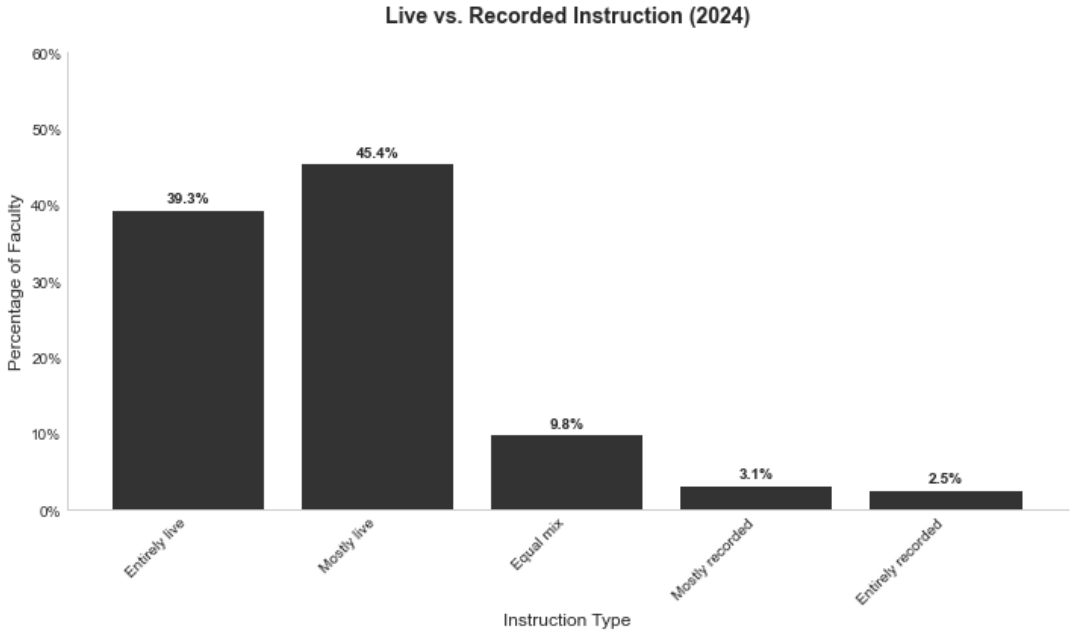
2. Teaching Modality Distribution (2024)



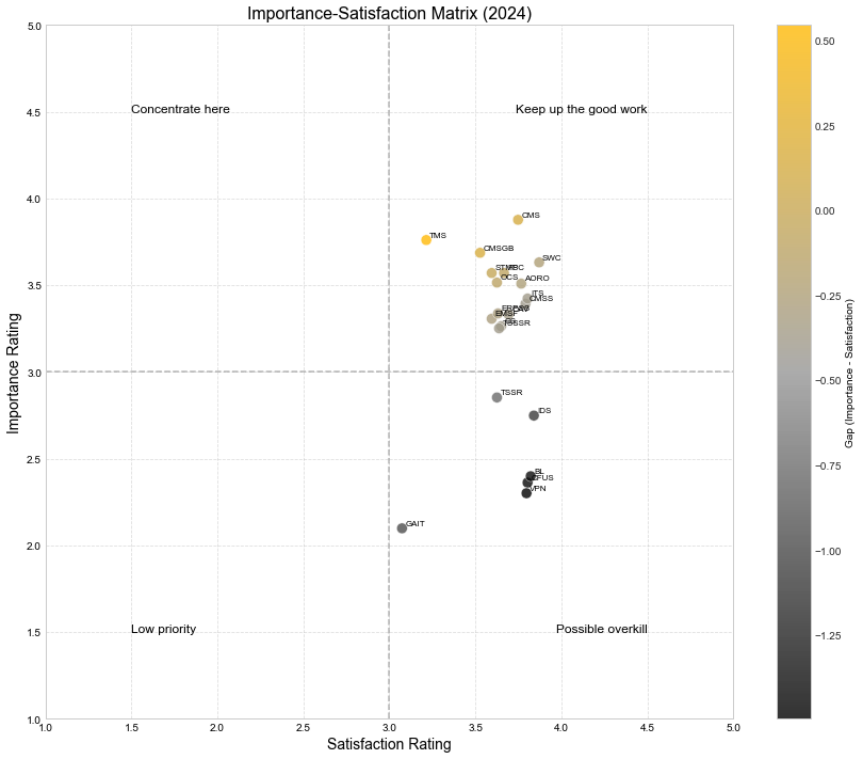
3. Relationship between Teaching Modality & Synchronicity (2024)



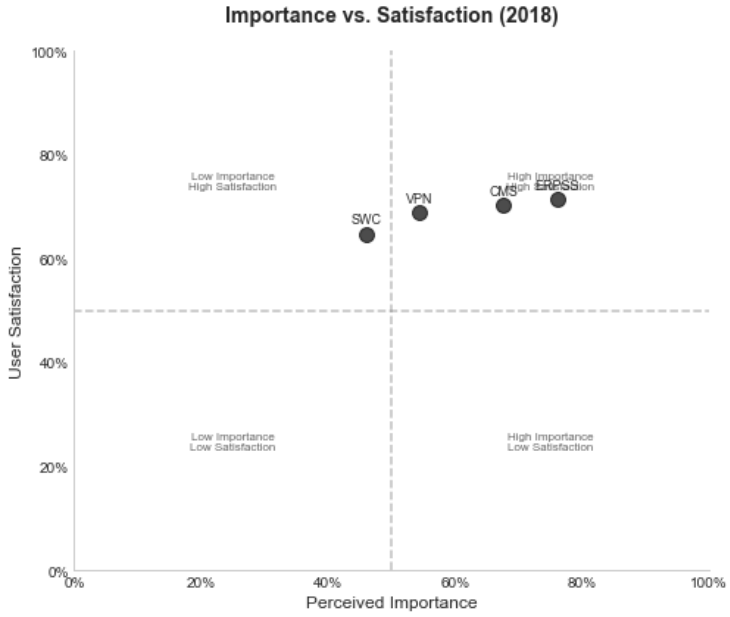
4. Live vs. Recorded Instruction (2024)

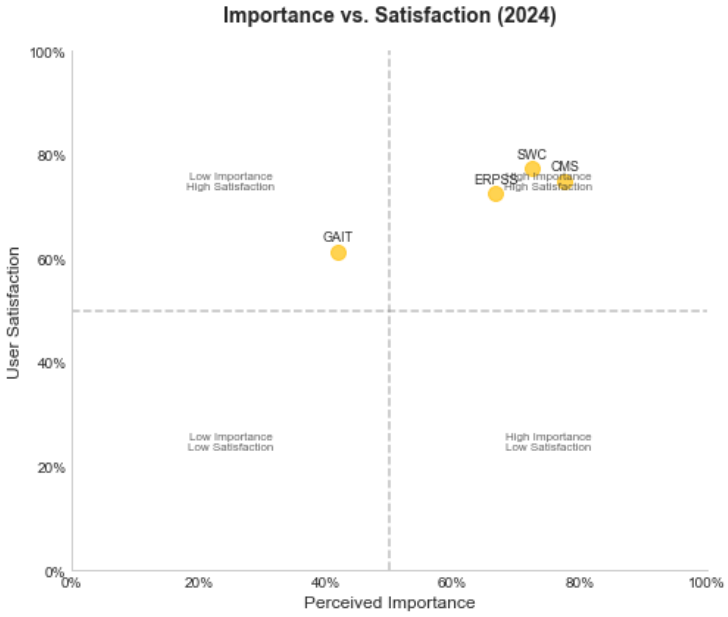


5. Importance-Satisfaction Matrix (2024)



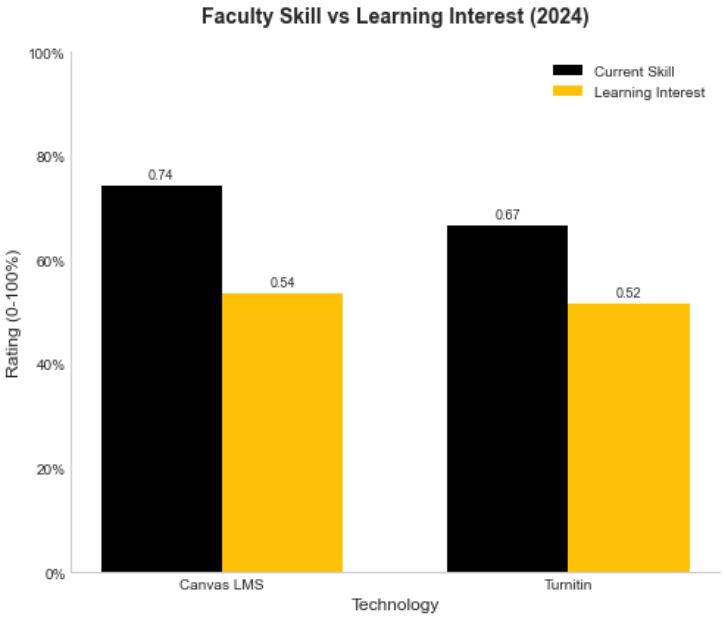
6. Importance vs Satisfaction Comparison (2018 vs. 2024)

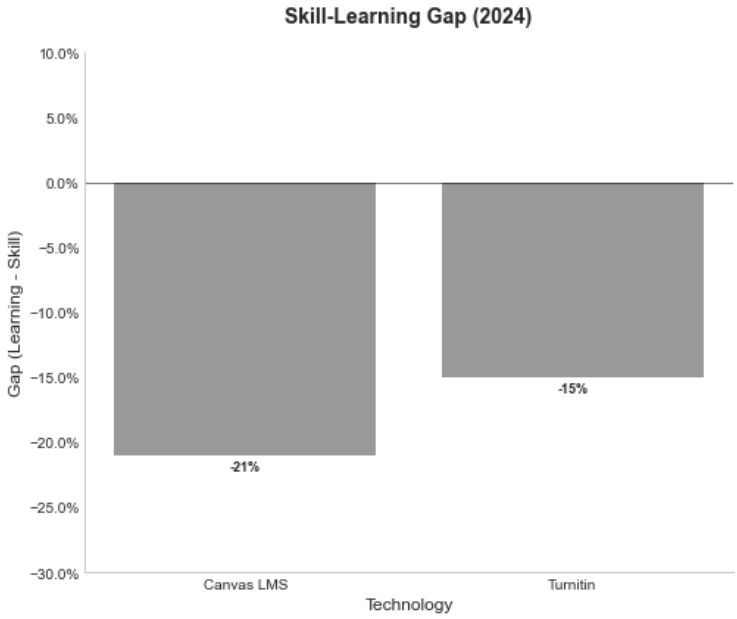




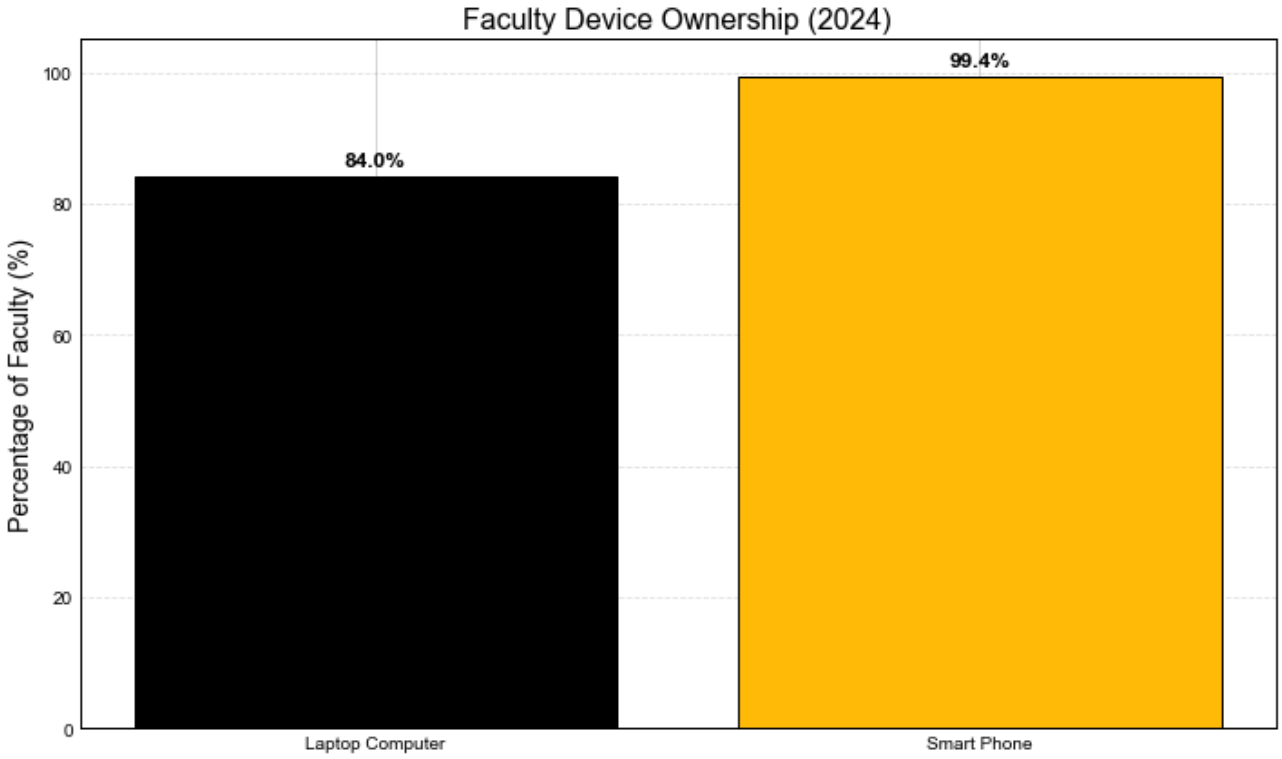
7. Service Quality Radar

8. Faculty Technology Skill vs. Learning Interest Gap (2024)

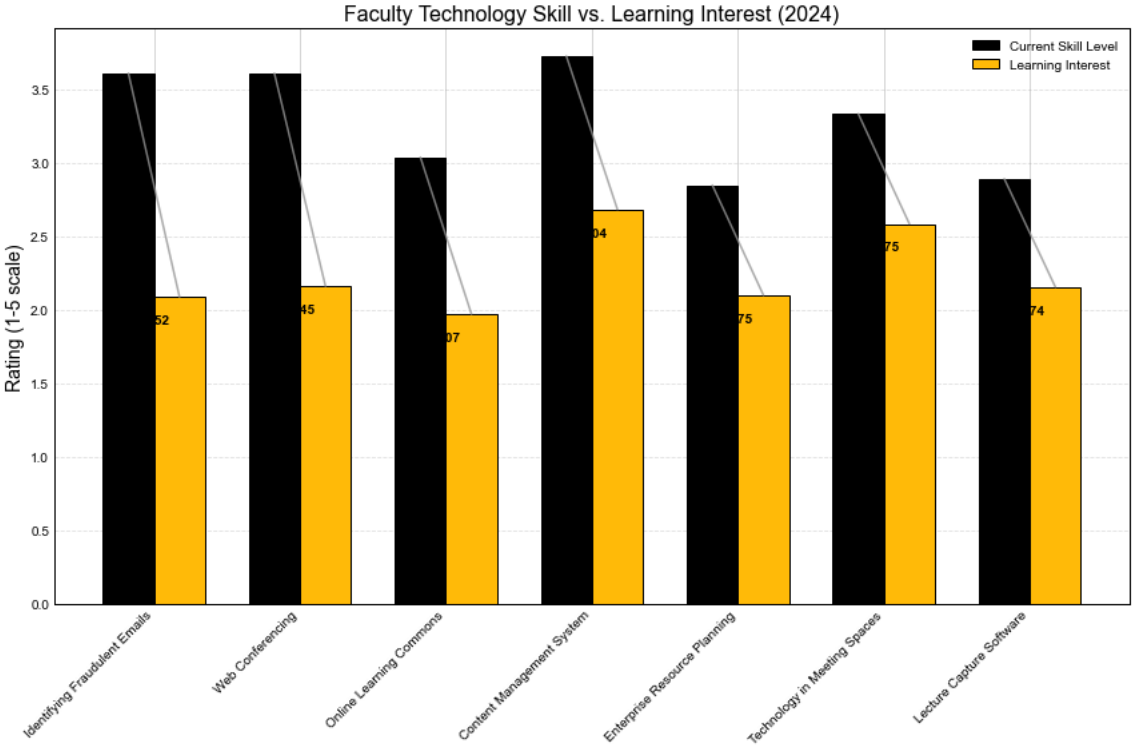




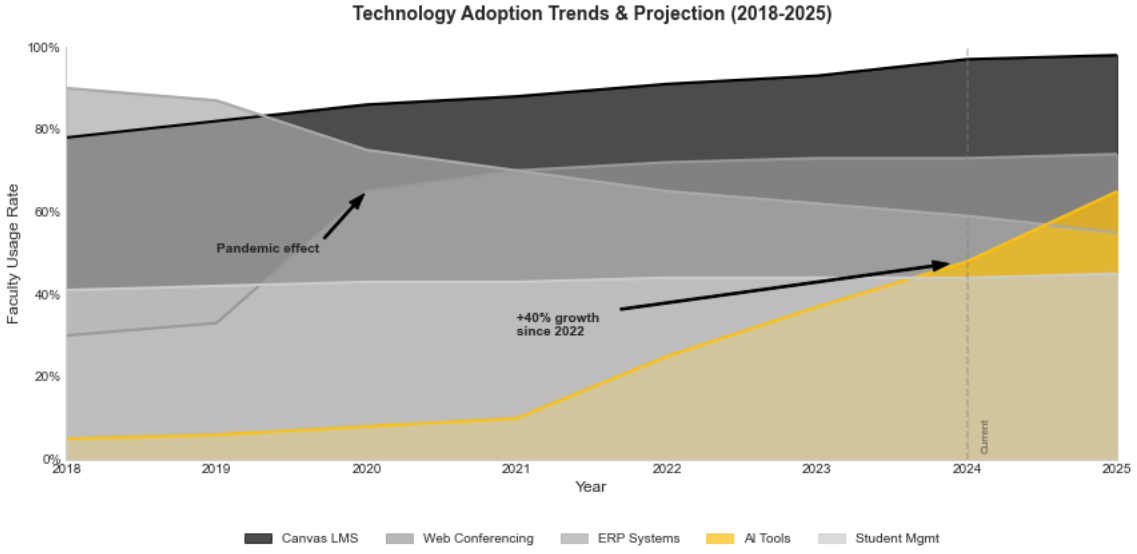
9. Faculty Device Ownership Bar Chart



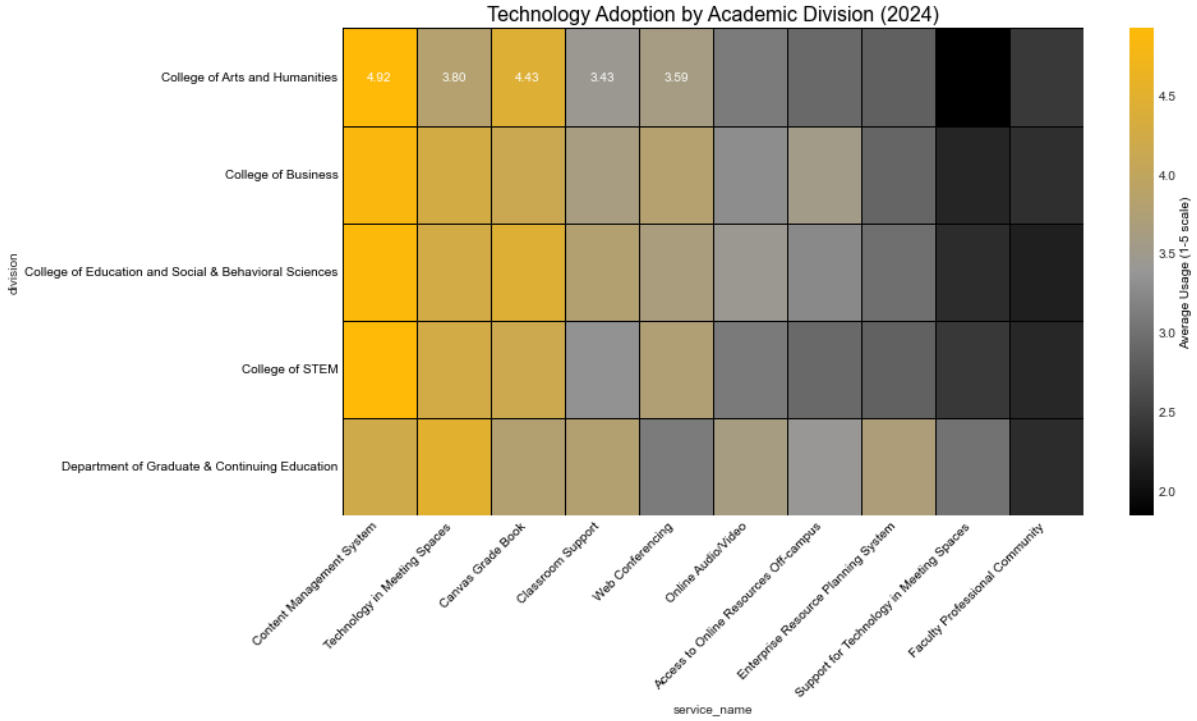
10. Faculty Technology Skill vs. Learning Interest Bar Chart (2024)



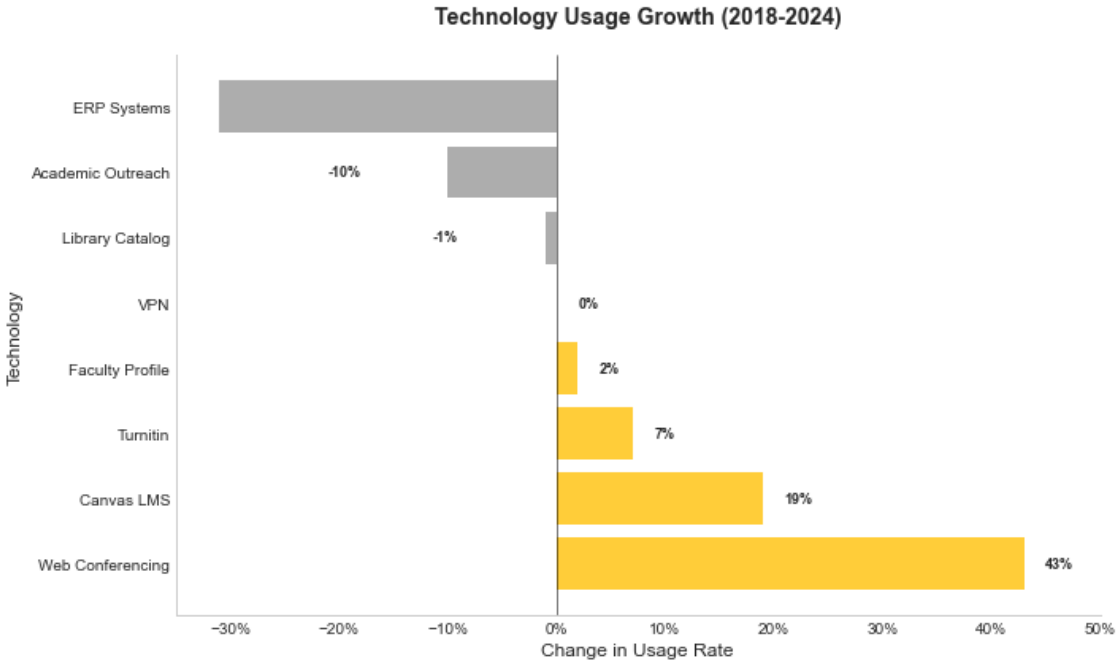
11. Technology Adoption Trends & Projection (2018-2025)



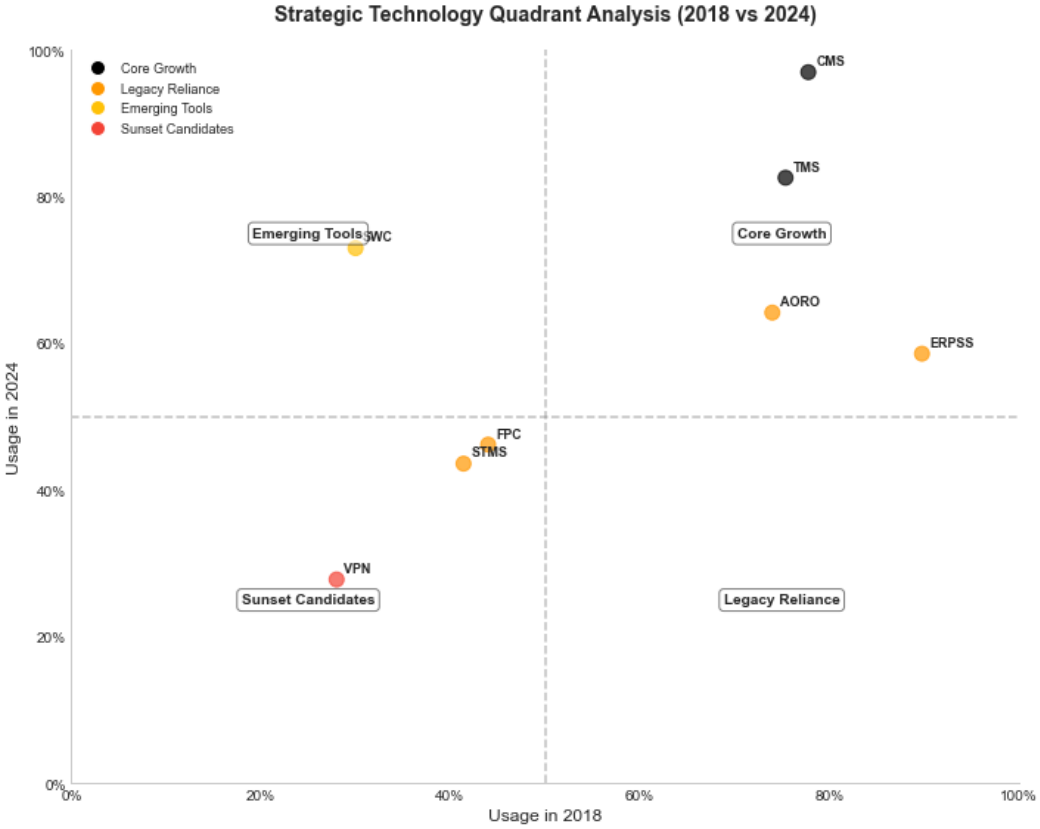
12. Technology Adoption by Academic Division (2024)



13. Technology Usage Growth (2018-2024)



14. Strategic Technology Quadrant Analysis (2018-2024)



15.ROI Optimisation: Importance vs Satisfaction (2024)

From 2018 to 2024, digital learning tools have greatly improved in satisfaction, but emerging AI tools now highlight the next frontier for growth.