Usability Evaluation & Recommendations

Arizona Science Center | azscience.org

Team SIGnature

Stephan Bui · Idil Kale · Gunikaa Agarwal

GIT 542 — User Experience Design | Final Presentation

Executive Summary

Key findings and recommendations at a glance

Test Goal

Evaluate usability of the Arizona Science Center website across ticket purchasing, event discovery, and exhibit exploration and deliver actionable recommendations for redesign.

Nature of Study

Mixed-method UX study: heuristic evaluations, accessibility audits, a 27-participant survey, and 9 moderated usability testing sessions across all three team members.

Major Findings

Ticket purchasing was the #1 pain point (all users who attempted it reported difficulty). Navigation was confusing. Event info was hard to find. Mobile experience was poor despite 80% mobile usage.

Why Change Is Needed

Users felt "overwhelmed" or "confused" navigating the site. Core tasks failed under observation. A cleaner, mobile-first redesign would increase ticket conversions and visitor satisfaction.

Introduction & Background

Why this evaluation was needed

Statement of Problem

The Arizona Science Center's website (azscience.org) serves as a key visitor touchpoint for ticket purchasing, event discovery, and exhibit information. Initial exploration revealed significant usability gaps that may discourage visitors from completing their goals especially on mobile devices.

Our team was tasked with conducting a full UX evaluation and providing data-driven redesign recommendations to improve the experience for all users.

Evaluation Journey - Semester Overview

Heuristic Evaluation
Each team member independently applied Nielsen's 10 heuristics. Critical issues found in ticket purchasing & navigation.

User Survey Research
27 participants surveyed on goals, frustrations, & feature priorities across the website.

Persona Creation
3 data-driven personas built: Alex (Efficient Planner), Maya (Event Explorer), Jordan (Curious Learner).

Accessibility Audit

WAVE tool used to identify accessibility violations across key pages.

Usability Testing Materials
Test plan, scenarios, tasks, and observation sheets created for moderated sessions.

Moderated Usability Testing

9 participants tested across 3 scenarios on the live website.

How Each Evaluation Informed the Next

Our UX process was iterative — each phase built directly on findings from the last

1. Heuristic Evaluation
Found: ticket flow broken, navigation confusing, visual clutter (severity 3–4/4)

→ Informed: Survey questions focused on ticketing friction, navigation labels, and visual design frustrations

2. User Survey (27 participants)
Found: 39.3% frustrated by visual design; 35.7% by ticket process; 28.6% by navigation

→ Informed: Personas built around 3 dominant behavior patterns; test scenarios matched top user goals

3. Persona Creation
Found: Alex (efficient planner), Maya (event explorer), Jordan (curious learner). All struggling with same core tasks

→ Informed: Each usability test scenario mapped 1:1 to a persona's primary goal

4. Accessibility Audit (WAVE)
Found: Missing alt text, low contrast ratios, sidebar absent on mobile

→ Informed: Accessibility issues added to observation checklist for usability test sessions

5. Usability Testing Materials
Built: 3 scenarios × 3 tasks each = 9 tasks, pre/post questionnaires, think-aloud protocol

→ Informed: Test tasks drawn directly from heuristic failures + top survey frustrations

6. Moderated Usability Testing (9 participants)
Confirmed: All prior findings. New insight: users prefer Google over site for exhibit info

→ Informed: 6 prioritized recommendations with prototype solutions for each confirmed pain point

Methodology

How we conducted the usability evaluation

Test Criteria & Rationale

- Scenarios based on 3 primary personas derived from 27-participant survey data
- Tasks aligned with top user goals: ticket purchasing, event discovery, exhibit exploration
- Prioritized issues with highest frustration ratings from survey (navigation, ticketing, visual design)
- Navigation treated as a cross-cutting concern affecting all 3 scenarios
- Mobile-first approach informed by 80%+ mobile device usage in survey

Data Collection Approach

- Pre-test questionnaires to capture demographics & prior familiarity
- Think-aloud protocol during moderated sessions to capture real-time reasoning
- Structured observation sheets with expected vs. actual navigation paths
- Timed task completion tracking where possible
- Post-test questionnaires using 1–5 Likert scales on ease, clarity & organization

Target Participants

- Target: 9 participants total (3 per team member)
- Recruited to reflect personas: efficiency-focused, exploratory, curiosity-driven
- Mix of prior familiarity levels with the website
- Primarily local Phoenix-area adults aged 18-34
- Tested on both mobile and desktop devices

Results - Participants & Demographics

Who participated in our usability study

9
Usability Test Participants

27
Survey Respondents

3
Personas Tested

3
Scenarios & 9 Tasks

Demographics (Combined Survey + Testing)

Age: Primarily 18–34 year olds (young adults & students)

Location: Mostly Phoenix metropolitan area (local)

Devices: 80%+ use mobile; majority also use desktop

Role: Primarily students and young professionals

Traits: Curious, creative, analytical, lifelong learners

Psychographic Profile

→ Task-oriented: Most users had a specific goal (tickets, events, info)

→ Low museum-site familiarity: Rarely or occasionally visit these sites

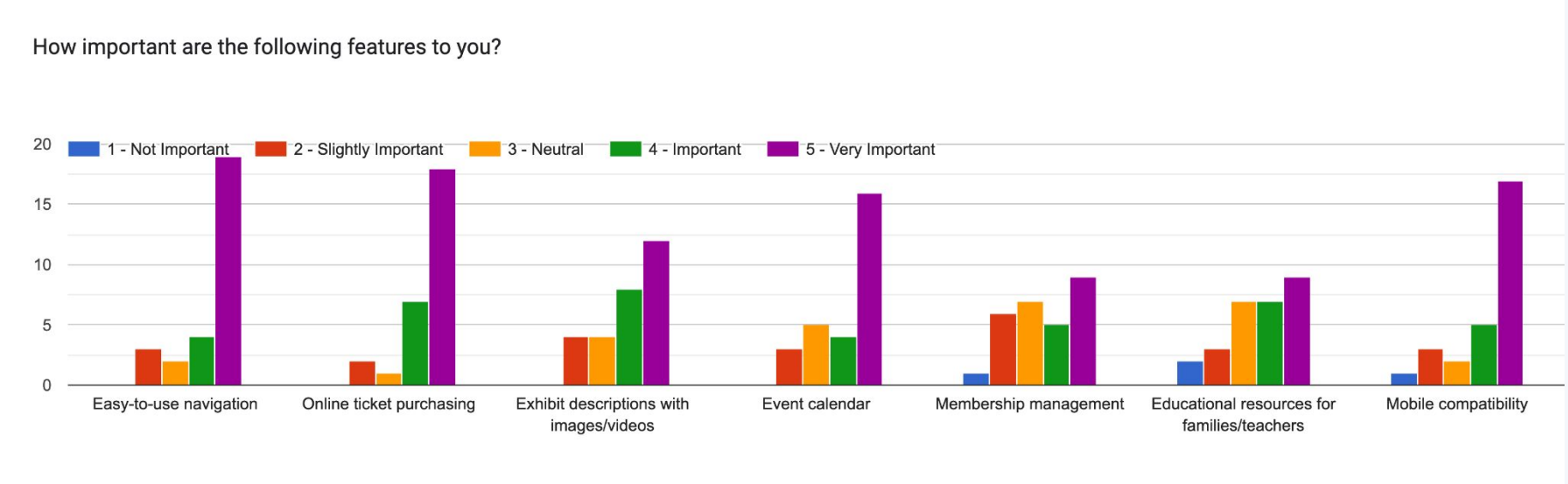
→ Emotionally: Felt curious but also overwhelmed/confused navigating

→ Motivated: 85% willing to participate in future testing

→ Expect: Fast, intuitive, mobile-friendly, modern & minimal design

Results - Survey Data Highlights

Quantitative findings from 27 survey participants



Results - Survey Data Highlights

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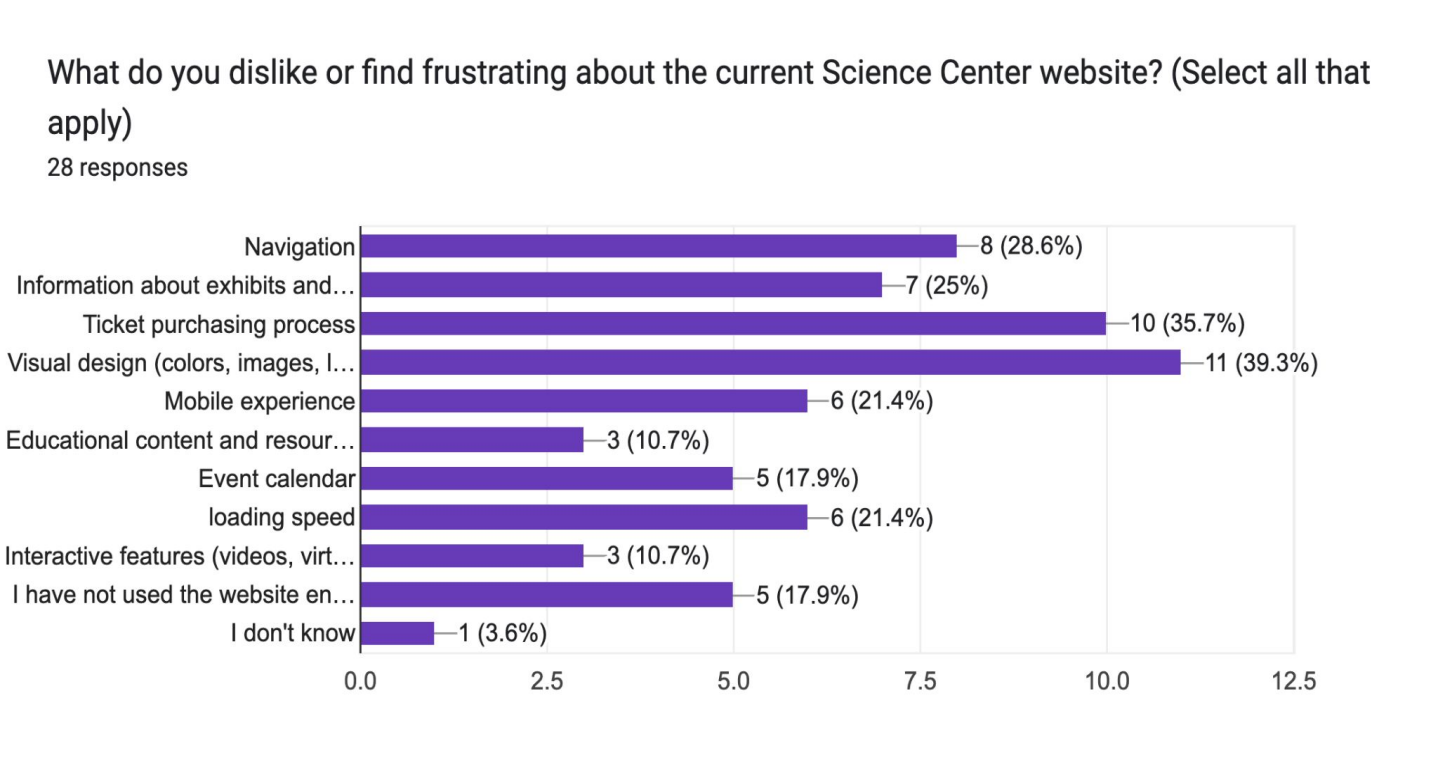
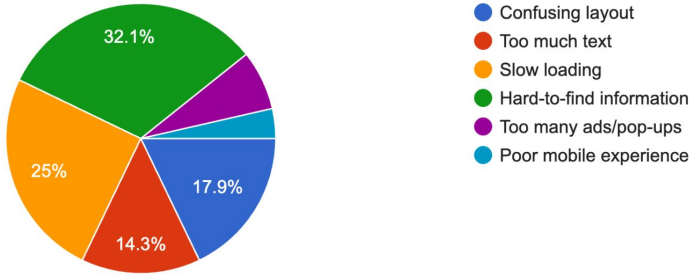


Results - Survey Data Highlights

Quantitative findings from 27 survey participants

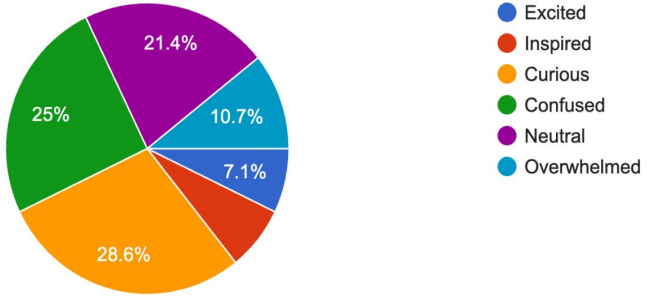
What makes you leave any website quickly?

28 responses



How does the Science Center website make you feel while navigating?

28 responses



Results - Usability Testing Observations

What participants did and said during 9 moderated sessions

Scenario 1: Quick Visit Planning

Persona: Alex - Efficient Ticket Planner

- Hours found by scrolling to footer - not immediately visible
- Location page accessible but required multiple steps
- Ticket flow: all 3 of Idil's participants reported difficulty; 0 found it easy
- Multiple users expressed confusion about the "BUY TICKETS" page that did not actually sell tickets
- "I'm not sure if I'm in the right place" - common think-aloud comment

Scenario 2: Event & Program Discovery

Persona: Maya - Event Explorer

- Event calendar rated 4.5/5 in importance - but 60% found it hard to locate
- Users confused by "Experience" nav label - expected "Events" or "What's On"
- Event cards lacked clear dates/times on the listing page - required deep clicks
- Users scrolled past events or gave up browsing long text-heavy lists
- "I don't know where to find what's going on this weekend" - direct quote

Scenario 3: Exhibit Exploration

Persona: Jordan - Curious Learner

- "Things to Do" grid visually cluttered - hard to identify what each section covers
- Exhibit info buried under "Experience" - 5/7 users frustrated with visual design
- Text-heavy exhibit pages - users preferred images/banners over dense paragraphs
- One participant said they would rather use Google to find exhibit info
- Task completed eventually but with significant hesitation and backtracking

Key Terms Defined for Stakeholders

Plain-language explanations of UX methods and severity ratings used in this report

Heuristic Evaluation

A structured expert review where evaluators check the site against 10 established usability principles (Nielsen's Heuristics). Each issue is rated 0–4 for severity.

Usability Catastrophe (Rating 4)

The highest severity level. Means the issue will prevent most users from completing a core task. Example: a 'Buy Tickets' page that does not actually allow ticket purchasing.

Severity Scale (0–4)

0 = No problem | 1 = Cosmetic only | 2 = Minor issue | 3 = Major issue - important to fix | 4 = Usability catastrophe - must fix before launch

Affinity Mapping (Qualitative Analysis)

After sessions, observations and quotes were grouped into clusters by theme (navigation, ticketing, visual design, mobile). Patterns that appeared across 3+ participants were elevated to recommendations.

Think-Aloud Protocol

Participants speak their thoughts out loud while completing tasks. This reveals what users expect, where they get confused, and why - giving qualitative insight beyond task completion data.

Pre/Post-Test Questionnaire

Surveys given before and after the session. Pre-test captures demographics and familiarity. Post-test captures satisfaction, ease of use, and perceived clarity on a 1-5 Likert scale.

Task Completion Rate

The percentage of participants who successfully completed a given task without giving up. A low rate signals a critical usability problem regardless of how fast users completed it.

Prototype (Lo-Fi / Hi-Fi)

A prototype is a draft version of the redesign. Low-fidelity (Lo-Fi) is a rough wireframe layout. High-fidelity (Hi-Fi) is a detailed, near-final visual mock-up built in Figma.

Qualitative Data Analysis - How We Analyzed What We Heard

From raw observations to prioritized recommendations

Our Analysis Process

1. **Step 1 - Data Collection**
   Each team member documented observations in real time using structured observation sheets. All think-aloud comments, hesitations, errors, and quotes were recorded verbatim during 9 sessions.
2. **Step 2 - Individual Coding**
   After each session, observations were tagged by category: Navigation, Ticketing, Visual Design, Mobile, Events, Exhibits. Direct quotes were flagged as evidence.
3. **Step 3 - Affinity Mapping**
   All 3 team members' notes were compiled and grouped into thematic clusters. Observations appearing across multiple participants or sessions were weighted as stronger patterns.
4. **Step 4 - Pattern Prioritization**
   Themes were ranked by frequency (how many participants experienced it) and severity (did it cause task failure?). Patterns meeting both criteria became HIGH priority recommendations.
5. **Step 5 - Triangulation**
   Qualitative patterns were cross-checked against survey data and heuristic ratings to confirm. A finding supported by all 3 methods (heuristics + survey + testing) was treated as confirmed.

Example: Affinity Map Clusters

Navigation Confusion

Frequency: 8/9 participants

— "I'm not sure if I'm in the right place"

— "Where would Events even be?"

— Looked under 3 menus before finding Hours

Ticket Flow Failure

Frequency: 6/9 participants

— "This page says Buy Tickets but I can't actually buy"

— All 3 Idil participants rated flow as difficult

— 0/3 found checkout intuitive

Visual Overload

Frequency: 7/9 participants

— "Too much going on"

— Scrolled past key sections without noticing

— Expressed feeling overwhelmed on homepage

Results — Usability Testing Success and Average Time

How long each task took to complete and their success rates

TASKS		WHAT PARTICIPANTS FINISHED THE TASK?												HOW LONG DID THE TASK TAKE TO COMPLETE? (in linear seconds, for instance: 65 instead of 1 min 05 seconds)										
ID	Task	p1	p2	p3	p4	p5	p6	p7	p8	p9	p10	Count	Success rate	t1	t2	t3	t4	t5	t6	t7	t8	t9	t10	Average
1	Hours of Operation Identification	1	1	1	1	1	1	1	1	1		9	90.00%	5	45	5	120	40	37	60	35	24		41.22
2	Location Identification	1	1	1	1	1	1	1	1	1		9	100.00%	120	45	60	25	35	23	85	50	50		54.78
3	Purchase Admission Identification	1	1	1	1	1	1	1	1	1		9	100.00%	45	30	45	35	55	90	70	40	40		50.00
4	Upcoming Event/Program Identification	1	1	1	1	1	1	1	1	1		9	100.00%	30	30	15	40	95	80	70	40	35		48.33
5	Event/Program Detail Finding	1	1	1	1	1	1	1	1	1		9	100.00%	120	60	60	50	85	90	95	55	63		75.33
6	Event/Program Personal Interest	1	1	1	1	1	1	1	1	1		9	100.00%	180	120	45	210	70	122	85	55	60		105.22
7	Featured Exhibit Finding	1	1	1	1	1	1	1	1	1		9	100.00%	180	30	120	50	60	39	80	45	42		71.78
8	Featured Exhibit Understanding	1	1	1	1	1	1	1	1	1		9	100.00%	120	60	60	120	45	140	105	60	55		85.00
9	Featured Exhibit Interest	1	1	1	1	1	1	1	1	1		9	100.00%	60	60	60	70	120	90	80	50	45		70.56

Spreadsheet Link: Google Slides

Recommendation 1 - Redesign the Ticket Purchasing Flow

ISSUE: The ticket purchasing flow is the site's most critical failure point.

Supporting Evidence

- Idil's usability testing: 3/3 participants who attempted ticket purchase reported difficulty; 0 found it easy
- Stephan's survey: 5/7 participants cited ticket purchasing as a top frustration
- Heuristic Evaluation: Rated 4/4 (Usability Catastrophe) page says "BUY TICKETS" but doesn't allow purchasing
- Gunikaa's survey: ticket purchasing rated "Very Important" by 13/15 respondents
- Post-test questionnaires confirmed confusion and low satisfaction with the ticket flow

Recommendation

- Implement a clear step-by-step ticket flow: Date → Ticket Type → Add-ons → Cart Review → Checkout
- Add a persistent cart summary sidebar so users can see their selections in real time
- Separate required tickets from optional add-ons (DOME, planetarium) to reduce confusion
- Display member login prompt early to ensure discount access
- Show clear confirmation that exhibit tickets are an add-on, not a standalone purchase

Prototype Link: Figma

Recommendation 2 - Simplify Navigation & Information Architecture

ISSUE: Navigation labels are unclear; users cannot find key content without excessive exploration.

Supporting Evidence

- Stephan's testing: every participant felt overwhelmed, confused, or curious none felt confident
- "Experience" label confused multiple participants who expected "Exhibits" or "What's On"
- Heuristic evaluation: navigation bar splits into two bars on desktop; inconsistent scroll behavior (rating 3/4)
- Gunikaa survey: 4/15 listed navigation as a top frustration; also ranked hard-to-find info as #1 exit trigger
- Idil's testing: participants had difficulty locating hours of operation, often resorting to footer search

Recommendation

- Consolidate the double navigation bar into a single, persistent header that stays consistent on scroll
- Rename vague labels: "Experience" → "Exhibits"; add a dedicated "Events" top-level nav item
- Surface "Hours & Location" and "Buy Tickets" as prominent hero CTAs on the homepage
- Reduce nested dropdown depth, flatten the navigation so key tasks are reachable in 1–2 clicks
- Ensure consistent navigation structure across mobile and desktop

Prototype Link: Figma

Recommendation 3 - Improve Event & Program Discovery

ISSUE: Over 60% of survey respondents said event information was difficult to find - despite it being a top user goal.

Supporting Evidence

- Stephan survey: 5/7 participants said event info was difficult to find
- Idil's participants: 3/5 found event discovery difficult; event calendar rated Very Important by 4/5
- Gunikaa survey: 6/15 found events easily vs. 6/15 who struggled; an even split on a primary task
- Usability testing: participants were unsure where to start browsing and overwhelmed by text-heavy layouts
- Heuristic eval: "Recognition rather than Recall" violation; events not visible without deep navigation (3/4)

Recommendation

- Add a "Today at the Science Center" section to the homepage highlighting current/upcoming events
- Redesign the Events page with a card-based layout: title, date, short description, and CTA visible at a glance
- Include filtering options by date, event type, and age group at the top of the Events page
- Surface the event calendar as a top-level navigation item (not buried under sub-menus)
- Remove text-heavy blocks; replace with scannable cards using images and key details

Prototype Link: Figma

Recommendations 4 & 5 - Homepage Redesign + Mobile Optimization

ISSUE 4: Homepage presents overwhelming, unorganized information causing immediate cognitive overload. MEDIUM

Evidence

- Heuristic eval: Double nav bar, persistent pop-up sidebar, language toggle = visual clutter (Aesthetic heuristic, 3/4)
- Survey: "overwhelmed" was the most common feeling when landing on the homepage
- "Things to Do" grid hard to interpret, random-sized rectangles with overlaid text

Recommendation

- Hero section with clear CTAs: "Buy Tickets," "Plan Your Visit," and "What's On"
- Organize below-fold content into distinct labeled sections: Exhibits, Events, Visit Info
- Remove or relocate the obstructive sidebar pop-up; place hours in the header instead

ISSUE 5: Mobile experience is inconsistent and frustrating despite 80%+ of users browsing on mobile. MEDIUM

Evidence

- Idil's heuristic eval: sidebar element completely absent on mobile, zero system status feedback
- Survey: mobile compat. rated Very Important by 12/15 (Gunikaa) and 5/5 (Idil) participants
- 6/7 of Stephan's survey participants browse primarily on mobile devices

Recommendation

- Adopt a mobile-first design approach: test all layouts on 375px viewport before desktop
- Ensure all interactive elements (sidebar, menus, CTAs) are present and functional on mobile
- Optimize loading speed: compress images, lazy-load below-fold content

Recommendations - Priority Summary

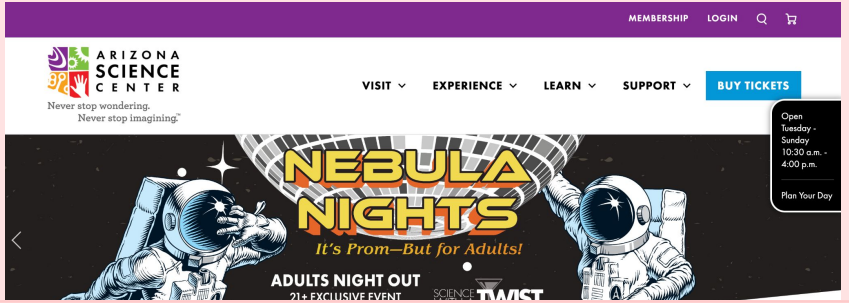
All recommendations ranked by severity

Issue	Recommendation	Priority
Confusing, non-functional ticket purchasing flow	Step-by-step ticket flow with persistent cart; clear step labels and required vs. optional separation	HIGH
Unclear navigation labels ("Experience", split navbar)	Rename labels, consolidate to single persistent nav bar; key tasks reachable in ≤2 clicks	HIGH
Event information difficult to find despite high importance	"Today at the Center" homepage section; card-based events page with filters and top-level nav	HIGH
Homepage cognitive overload: too much information at once	Clear hero with 3 CTAs; distinct labeled sections; remove/reposition obstructive sidebar pop-up	MEDIUM
Poor mobile experience despite 80%+ mobile user base	Mobile-first design; consistent elements across breakpoints; image compression + lazy loading	MEDIUM
"Things to Do" exhibit grid hard to scan and interpret	Structured grid with clear labels, descriptive captions, and consistent image treatment	LOW

Before & After - Homepage Redesign (Rec. 1)

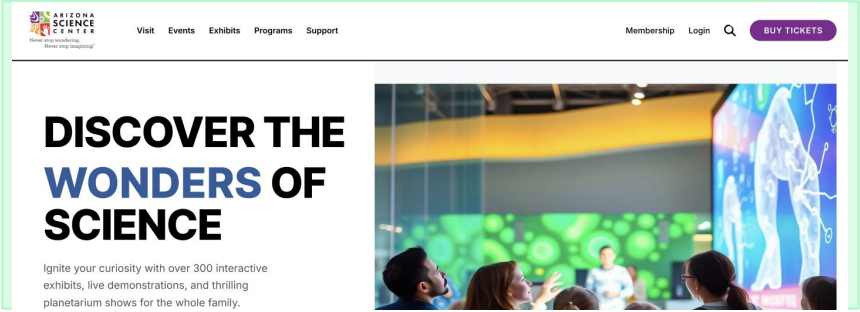
How the prototype resolves cognitive overload and improves first impressions

CURRENT SITE — Problems Found



- "overwhelmed" was the most common emotional response (survey)
- Double nav bar: users unsure which to use, changes on scroll
- Pop-up sidebar blocks content on every page — not just homepage
- "Things to Do" grid: random rect sizes, low text contrast on images
- No clear 'Buy Tickets' or 'Plan Your Visit' CTA visible above fold
- Heuristic: Aesthetic & Minimalist Design — rated 3/4 (Major Issue)

PROTOTYPE REDESIGN — Solutions Applied



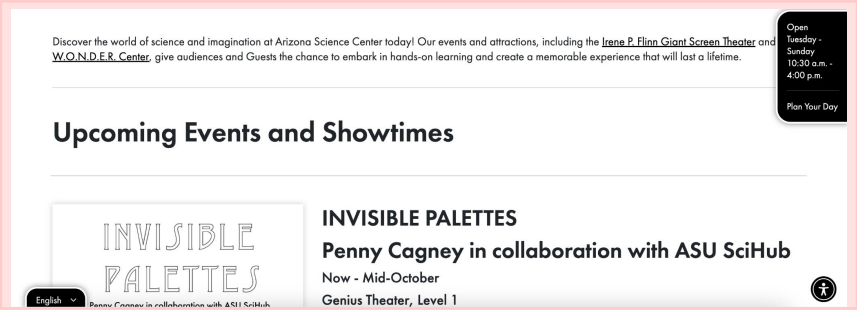
- Single persistent nav bar: Visit | Events | Exhibits | Programs | Support
- Hero section with 2 prominent CTAs: 'Buy Tickets' and 'Plan Your Visit'
- Pop-up replaced: hours & location surfaced directly in header
- "Today at the Science Center" highlights upcoming events immediately
- Structured grid: uniform card sizes, clear labels, readable text contrast
- Below-fold content organized into labeled sections: Exhibits, Events, Visit Info

Prototype Link: Figma

Before & After - Events Page Redesign (Rec. 2)

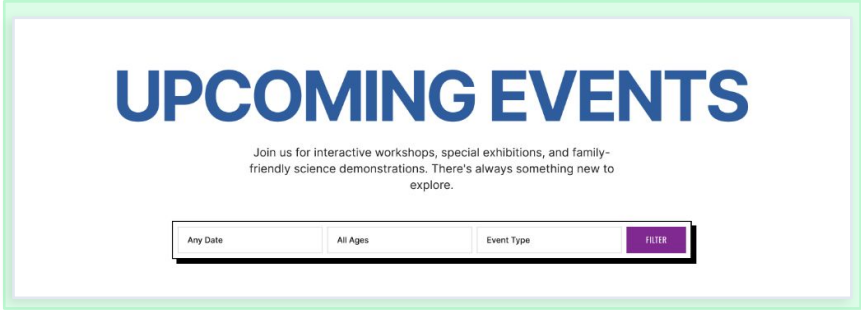
How the prototype makes event discovery fast and intuitive

CURRENT SITE — Problems Found



- 60% of survey respondents said event info was difficult to find
- "Experience" nav label - users expected "Events" or "What's On"
- Event listing: no dates or images visible - requires deep clicking to preview
- Users scrolled past events or gave up; none used filtering (none existed)
- "I don't know where to find what's going on this weekend" - participant
- Heuristic: Recognition over Recall violation - rated 3/4 (Major Issue)

PROTOTYPE REDESIGN — Solutions Applied



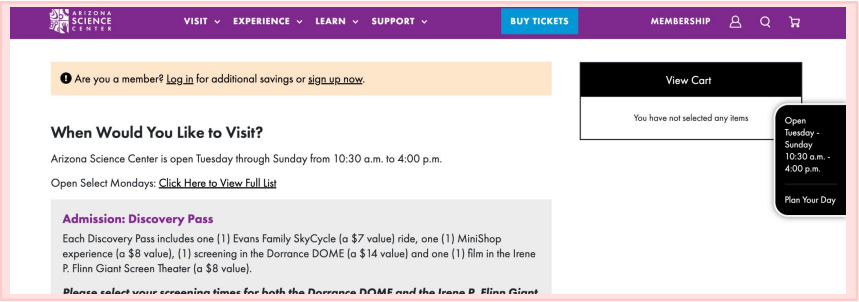
- "Events" promoted to top-level nav - reachable in one click from anywhere
- "Today at the Science Center" preview section added to homepage
- Card-based layout: each event shows image, title, date/time, and CTA at a glance
- Filter bar at top: sort by date, event type, and audience age group
- "Buy Tickets Now" button anchored at bottom - always accessible
- Featured events section at top highlights most popular upcoming programs

Prototype Link: Figma

Before & After - Ticket Purchasing Flow (Rec. 3)

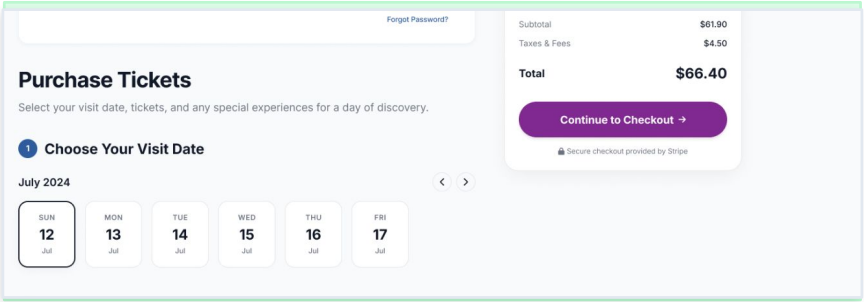
How the prototype directly resolves the issues found in testing

CURRENT SITE — Problems Found



- 44% ticket completion rate
- 9/9 participants experienced confusion
- Page labeled 'Buy Tickets' but redirects to external system with no context
- 0/3 of Idil's participants found the flow easy
- Heuristic rating: 4/4 - Usability Catastrophe

PROTOTYPE REDESIGN — Solutions Applied

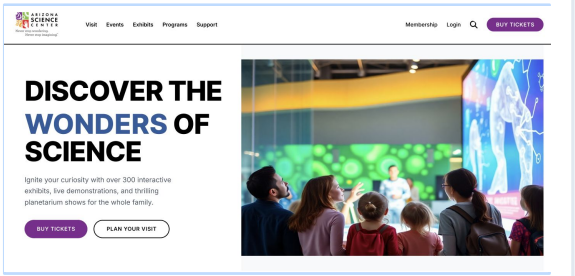


- Clear step-by-step flow with numbered progress indicator
- Persistent cart sidebar: users see total at all times
- Required admission tickets separated from optional add-ons (DOME, Planetarium)
- Member login prompt at top - discounts apply before checkout
- Step labels match user mental model: plain language throughout

Prototype Link: Figma

Prototype Overview

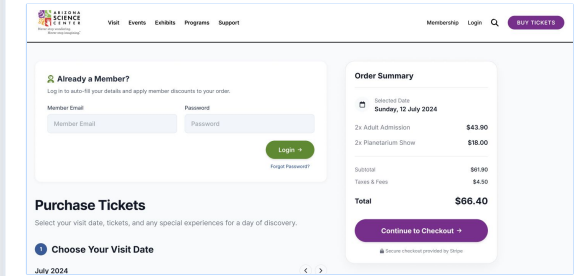
Our redesigned pages - low-fidelity to high-fidelity



Homepage Redesign

- Clear hero with Buy Tickets, Plan Visit, What's On CTAs
- "Today at the Science Center" events section
- Structured Things to Do grid with labeled cards
- Simplified single nav bar consistent on all devices

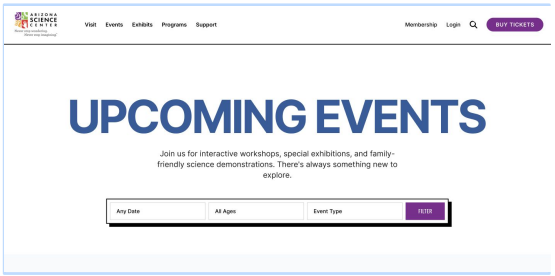
Prototype Link



Ticket Page Redesign

- Step-based layout: Date ⟶ Tickets ⟶ Add-ons ⟶ Review
- Persistent cart summary on the right side
- Clear separation of general admission vs. special events
- Member login prompt near top for early discount access

Prototype Link



Events Page Redesign

- Featured events card section at top of page
- Filter options: date, event type, audience
- Consistent event card: image + title + date + CTA
- "Buy Tickets Now" CTA anchored at bottom of page

Prototype Link

All prototypes include low-fidelity and high-fidelity versions. View individual pages via the Figma links above.

Conclusion & Future Opportunities

Reinforcing key findings and next steps

Key Conclusions

- The Arizona Science Center website has the right content — but it's not structured for how users actually navigate and think
- Ticket purchasing, navigation, and event discovery are the three highest-impact areas for redesign
- Users are motivated and task-oriented; the site's usability friction, not lack of interest, is the barrier to conversion
- Mobile-first design is essential: 80%+ of users browse on mobile, yet the site is clearly desktop-optimized
- All 6 recommendations are grounded in consistent patterns across heuristic evaluations, survey data, and live usability testing
- Task completion happened, but with hesitation, confusion, and frustration. Success is not equal to good usability

Future Research Opportunities

→ Expand participant pool to include parents, educators, and tourists - not just students
→ Conduct A/B testing on the redesigned prototype vs. the current site
→ Run a second round of moderated testing specifically on mobile devices
→ Incorporate analytics (heatmaps, funnel drop-off) to validate quantitative findings

What We'd Do Differently

→ Recruit participants with wider familiarity ranges - less student-heavy sample
→ Use screen recording tools to capture every navigation interaction
→ Record time-on-task consistently across all 9 participants
→ Use a more structured observation shorthand for real-time note-taking
→ Provide clearer think-aloud prompting to reduce silent navigation moments

Thank You

Questions are welcome

UX Workbook: SIGnature Workbook Link (Google Docs)

Prototypes (High-Fi): Figma Link

Live Site: azscience.org

Stephan Bui · Idil Kale · Gunikaa Agarwal | Team SIGnature | GIT 542