LabLine - A smart queue management system

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Introduction

Labline

- A smart queue management system for university computer labs.
- Replaces outdated hand-raising with a digital, fair, and efficient solution.
- Built using Django, WebSockets, and AWS - supports real-time help requests between students and tutors.
- Focused on inclusivity, efficiency, and data-driven improvement of lab sessions.

Our Motivation and Mission

- Frustrations in labs: long waits, chaotic queues, overlooked students.
- Driven by personal experience and empathy - especially for students with social anxiety.
- Mission: Fair access to help for all students, regardless of confidence or visibility.
- LabLine creates a structured, inclusive, supportive learning environment.

Why is Labline Important?

Students:

- Know their queue position & estimated wait time.
- Request help without disrupting the class.
- Encouraged to ask for help discreetly.

Tutors:

- Structured dashboard - no more guesswork.
- Balanced workloads (round-robin assignment).

Lecturers/Admin:

- Data insights into lab performance & demand.
- Smarter staffing & better resource allocation.

Key features

- Request management (Send request, accept request, cancel request).
- Custom user specific Dashboards to make/manage help requests
- Queue position and estimated wait times.
- Lab layouts to locate pending requests.
- Lab layout creator.

Competitor analysis

- Systems like LabLine are university specific.
- Similar competitors exist in the queue system market:
  - Zendesk involves agents receiving tickets from customers.
  - Qless adds users to their queue and notifies them when it’s their turn.

Market Analysis and Trends

- Initial focus: Irish universities.
- ICT student numbers in Ireland: 15,590 (2017) to 21,195 (2023).
- Student-staff ratio has worsened: 13:1 (1980s) to 23:1 now.
- Increased demand for scalable, efficient solutions.

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Revenue Streams

Standard Monthly Licence (Core Plan):

- Core features including request queues and real time updates - €1,500 per lab per month.

Monthly Subscription (Premium Plan):

- Usage trends, advanced analytics and priority access to new features and updates - Additional €400 per lab per month.

LabLine provides all of this in one place without requiring subscriptions from multiple applications.

Financial Plan - Year 1

Funding Sources:

- Angel investment: €50,000
- Founders' capital: €50,000
- AIB Business Loan: €40,000
- Total Year 1 Capital: €140,000

Projected Revenue:

- 10 labs onboarded
- 6 using Premium Plan (€400/mo extra)
- Total Year 1 revenue: €121,400

Financial Plan - Year 2 & 3

Year 2:

- 21 labs onboarded
- 12 using Premium Plan
- Projected revenue: €327,900

Year 3:

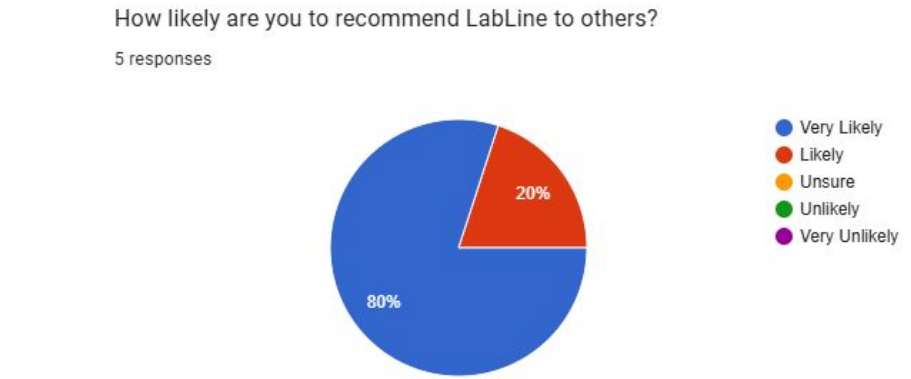
- 25 labs onboarded
- 14 using Premium Plan
- Projected revenue: €496,800
- Scalable AWS infrastructure keeps costs predictable
- Focus shifts to retention & customer support in Year 3

Value Propositions

- Improved Student Satisfaction: Reduced wait times, inclusive support.
- Data-Driven Decision Making: Real-time analytics on lab usage and tutor performance.
- Efficient Tutor Allocation: Fair workload distribution reduces burnout.
- Supports Diverse Learners: Fully digital system supports those with social anxiety or learning differences.
- Institutional ROI: Reduces admin overhead and tutor scheduling inefficiencies.

User testing

- User testing revealed that students would recommend LabLine to their peers.
- Tutors could plan ahead for their next pending request.
- Feedback implemented into LabLine (e.g. dropdown for choosing lab and PC).



What have been the main benefits of Labline towards your role?

1 response

Easier to see what student is next in line for help

Technologies used

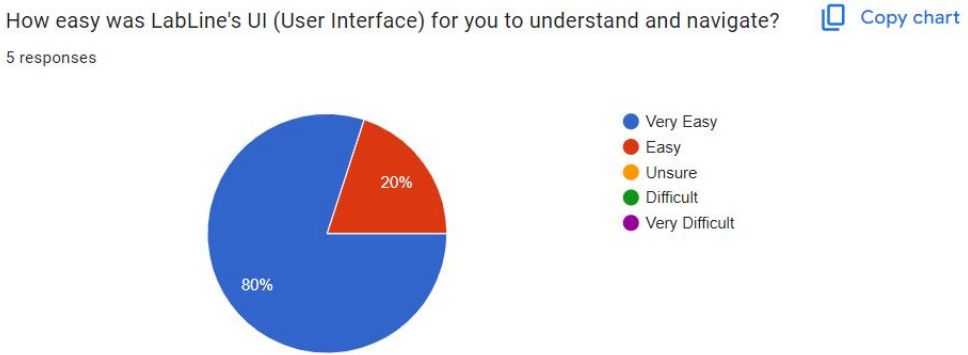
- **Frontend**: HTML, CSS, Bootstrap
- **Backend**: Python, Django
- **Real-Time Updates**: Django Channels + WebSockets
- **Hosting**: AWS EC2
- **Tools**: GitLab for CI/CD, Trello for agile task management

System Architecture

- Frontend includes UI developed with HTML, CSS and Bootstrap.
- Backend includes Django framework, managing core functionality.
- Data layer includes models corresponding to users, requests and lab layouts.
- WebSocket consumers handle live updates with WSGI.

Interface Rationale

- Minimalist design with light backgrounds & dark text
- Role-specific dashboards: Student, Tutor, Lectur
- Buttons styled by action (e.g., red = cancel)
- Accessibility-focused layout
- Fully mobile-responsive with collapsible navbars



Future Work

- Plan to continue implementing new features suggested by users from user feedback:
  - Group multiple students under one common request.
  - Ability to edit an existing request instead of re-submitting another.
  - Integration into Learning Management Systems like Loop.
- Expand into international universities.

References

“Key Facts and Figures 2023/2024”https://hea.ie/statistics/data-for-download-and-visualisations/key-facts-figures/

Student Feedback - https://docs.google.com/forms/d/16fEUUH5vGgRBaBeQp2NQzWf6uEnbDMFwF9o4lLL2WlE/edit

Tutor Feedback - https://docs.google.com/forms/d/1tKChYex_3XehblSRxI5ADaQChuI_M-jX1d4UFaXsxYA/edit?pli=1

O’Brien, C. (2023, September 25). “Student-Staff ratios in universities “much-worse” than recession-hit 1980s, warns UCD president”. IrishTimes https://www.irishtimes.com/ireland/education/2023/09/25/student-staff-ratios-in-universities-are-much-worse-than-recession-hit-1980s-warns-ucd-president/