
Group 06

VocaBoost
Software Development Plan
Version 2.0

VocaBoost	Version: 2.0
Software Development Plan	Date: 13/06/2025
SDP	

Revision History

Date	Version	Description	Author
28/05/2025	1.0	Initial Project Plan creation including project overview, team organization, and management processes	All team members
13/06/2025	2.0	Updated based on PA1 feedback and PA2 requirements - refined timeline, enhanced resource planning, improved risk management	All team members

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Software Development Plan

1. Introduction

This Software Development Plan provides a comprehensive overview of the VocaBoost project development process, including project organization, management processes, and deliverables. The plan serves as a guide for the project team and stakeholders throughout the development lifecycle from May 19, 2025, to August 10, 2025.

2. Project Overview

2.1 Project Purpose, Scope, and Objectives

Purpose: VocaBoost aims to address the critical challenge of vocabulary retention in English learning by implementing a scientifically-proven Spaced Repetition system in an accessible web application format.

Scope: The project encompasses the development of a web-based vocabulary learning platform with the following core components:

- User authentication and profile management system
- Vocabulary list creation and management
- Spaced Repetition learning engine
- Multiple learning modes (Flashcards, Fill-in-the-blank, Word Association)
- Classroom management for teachers
- Progress tracking and analytics
- AI-powered example sentence generation

Objectives:

1. Deliver a fully functional web application that helps users retain vocabulary effectively
2. Implement the SM-2 Spaced Repetition algorithm for optimal learning intervals
3. Build a simple interface that's easy to understand and use.
4. Support both individual learners and classroom environments
5. Achieve 80% user satisfaction based on usability testing

2.2 Assumptions and Constraints

Assumptions:

- All team members will be available throughout the project duration
- Required technologies and tools will remain accessible
- All team members are proficient in the required technologies and methodologies
- Users have basic internet connectivity and modern web browsers
- External APIs (Gemini AI) will maintain 95%+ uptime
- Stakeholders will provide timely feedback and approvals throughout the project lifecycle

Constraints:

- Fixed project schedule of 12 weeks (May 19 - August 10, 2025)
- Zero budget (using free tools and resources only)
- Team size limited to 5 members with no additions during the project
- Must follow RUP and Scrum methodologies as specified in course requirements
- Database storage limited to Supabase free tier (500MB)
- AI API calls limited to free tier quotas
- Development must align with course assignment deadlines

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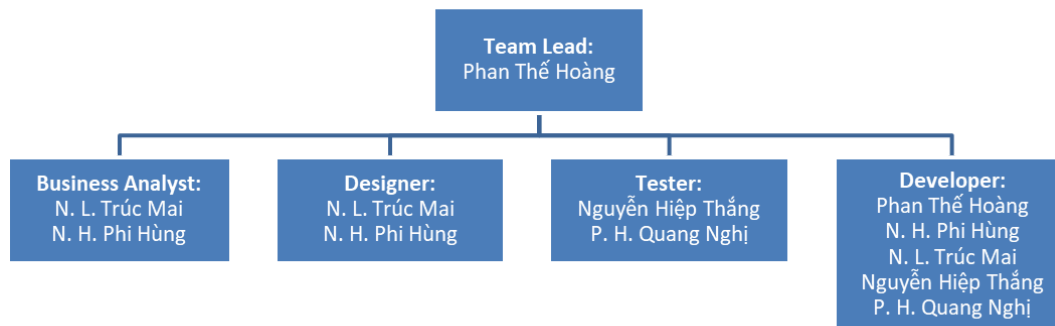
2.3 Project Deliverables

Deliverable	Description	Components	Target Date
PA0 - Project Proposal & Tools Setup	Team formation, project proposal, and development environment setup	<ul style="list-style-type: none"> • Team registration form • Project proposal document • Tool configuration (Slack, JIRA, Git) 	May 26, 2025
PA1 - Vision Document & Project Plan	Initial requirements documentation and project planning	<ul style="list-style-type: none"> • Vision document (1st submission) • Project plan (1st submission) • Weekly report 	June 1, 2025
PA2 - Use Case Model	Detailed requirements with use case diagrams and specifications	<ul style="list-style-type: none"> • Revised project plan (2nd submission) • Detailed vision document (2nd submission) • Use-case model (diagrams) • Use-case specifications • Weekly report 	June 15, 2025
PA3 - Architecture & Design	Software architecture document, class diagrams and database design	<ul style="list-style-type: none"> • Use-case specification (2nd submission) • Software Architecture Document (SAD) • Class diagrams for key components • Weekly report 	June 29, 2025
PA4 - Implementation Phase 1	Core features implementation with UI design and testing	<ul style="list-style-type: none"> • Revised SAD with deployment diagram • UI prototype (main screen + 3 key scenarios) • Working software (at least 1 main use-case) • Test plan document • Test cases (15+ test cases for 3 use-cases) • Test execution report • Folder structure documentation • Weekly report 	July 27, 2025
PA5 - Final Product	Complete implementation, testing, and project presentation	<ul style="list-style-type: none"> • Full feature implementation • Test cases for all implemented use-cases (3+ per use-case) • Test execution report with defects • Automated testing (2 use-cases, 2 scenarios each) • Project presentation (15 min presentation + 10 min Q&A) • Final submission package • Weekly report 	August 10, 2025

3. Project Organization

3.1 Organizational Structure

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3.2 Roles and Responsibilities

Role	PICs	Responsibilities
Team Leader	Phan Thế Hoàng	<ul style="list-style-type: none"> • Coordinate team activities and meetings • Monitor project progress and deadlines • Communicate with stakeholders (TAs, instructors) • Resolve conflicts and make final decisions • Review and approve major deliverables • Manage JIRA boards and sprints
Backend Developer	Phan Thế Hoàng Nguyễn Hiệp Thắng Phan Hoàng Quang Nghi	<ul style="list-style-type: none"> • Design and implement RESTful APIs • Implement Spaced Repetition algorithm (SM-2) • Develop business logic and data processing • Database integration and optimization • Implement authentication and authorization • Code review for backend components
Frontend Developer	Nguyễn Hoàng Phi Hùng Nguyễn Lê Trúc Mai Phan Hoàng Quang Nghi	<ul style="list-style-type: none"> • Implement user interface components • Integrate with backend APIs • Ensure responsive design across devices • Implement learning modes (flashcards, fill-in-blank, word association) • Handle client-side state management • Code review for frontend components
Business Analyst	Nguyễn Hoàng Phi Hùng Nguyễn Lê Trúc Mai	<ul style="list-style-type: none"> • Gather and document requirements • Create use case diagrams and specifications • Conduct user interviews and surveys • Validate requirements with stakeholders

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		<ul style="list-style-type: none"> • Update vision document • Ensure features align with user needs
Tester	Nguyễn Hiệp Thắng Phan Hoàng Quang Nghi	<ul style="list-style-type: none"> • Develop test plan and strategies • Design test cases for all use cases • Execute manual testing • Set up automated testing framework • Document and track defects • Prepare test reports and metrics
System Designer	Nguyễn Hoàng Phi Hùng	<ul style="list-style-type: none"> • Create software architecture document • Design system components and interactions • Create class diagrams and sequence diagrams • Define technology stack • Design deployment architecture • Ensure scalability and maintainability
UI/ UX Designer	Nguyễn Lê Trúc Mai	<ul style="list-style-type: none"> • Design wireframes and mockups • Create UI prototypes • Define visual design guidelines • Conduct usability testing • Ensure consistent user experience • Design responsive layouts

4. Management Process

4.1 Project Estimates

4.1.1 Cost Estimates

Direct Costs:

- Development team: \$0 (student project - no salaries)
- Software licenses: \$0 (using free/open-source tools only)
- Cloud hosting: \$0 (using free tiers - Supabase)
- Third-party APIs: \$0 (using free tiers - Google Gemini API)
- Hardware: \$0 (using personal computers)
- Total Direct Cost: \$0

Opportunity Cost Analysis:

- 5 team members × 20 hours/week × 12 weeks = 1,200 person-hours
- Estimated market value: 1,200 hours × \$10/hour = \$12,000 opportunity cost
- Educational value: Priceless (academic project constraint)

4.1.2 Time Estimates

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Effort Distribution by Activity:

- Requirements Analysis: 120 hours (12.6%)
- System Design: 200 hours (21.1%)
- Implementation: 400 hours (42.1%)
- Testing: 150 hours (15.8%)
- Documentation: 80 hours (8.4%)
- **Total Effort: 950 hours**

Critical Path Activities:

- Database design and setup: 2 weeks
- User authentication system: 1.5 weeks
- Spaced Repetition algorithm implementation: 3 weeks
- Frontend-backend integration: 2 weeks

4.1.3 Size/Scope Estimates

Functional Size:

- **Use Cases:** 15 primary use cases
- **Features:** 30 functional requirements
- **Database Tables:** 8-10 main entities
- **API Endpoints:** 25-30 RESTful endpoints

4.2 Project Plan

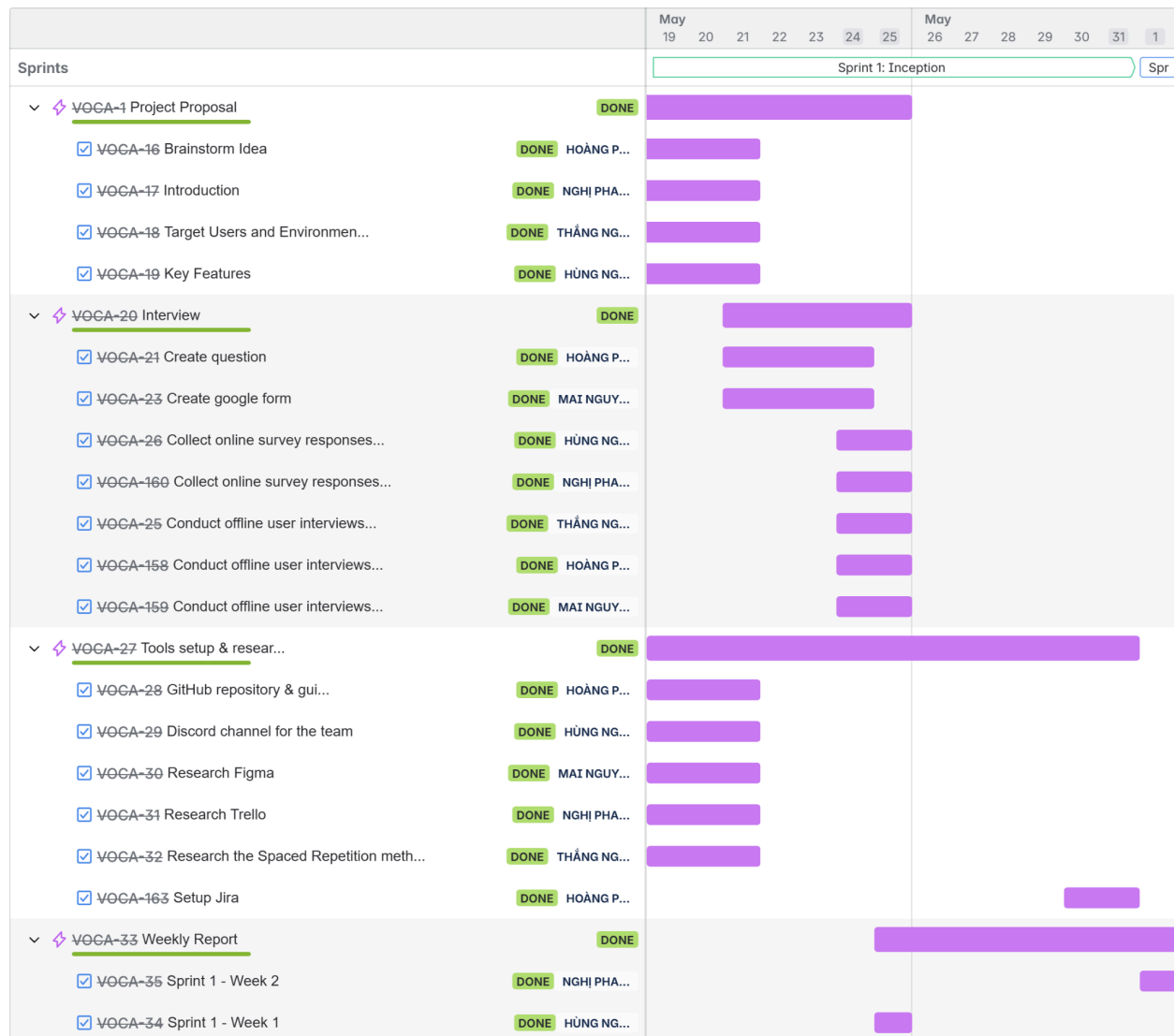
4.2.1 Phase and Iteration Plan

Phase 1: Inception (Sprint 1)

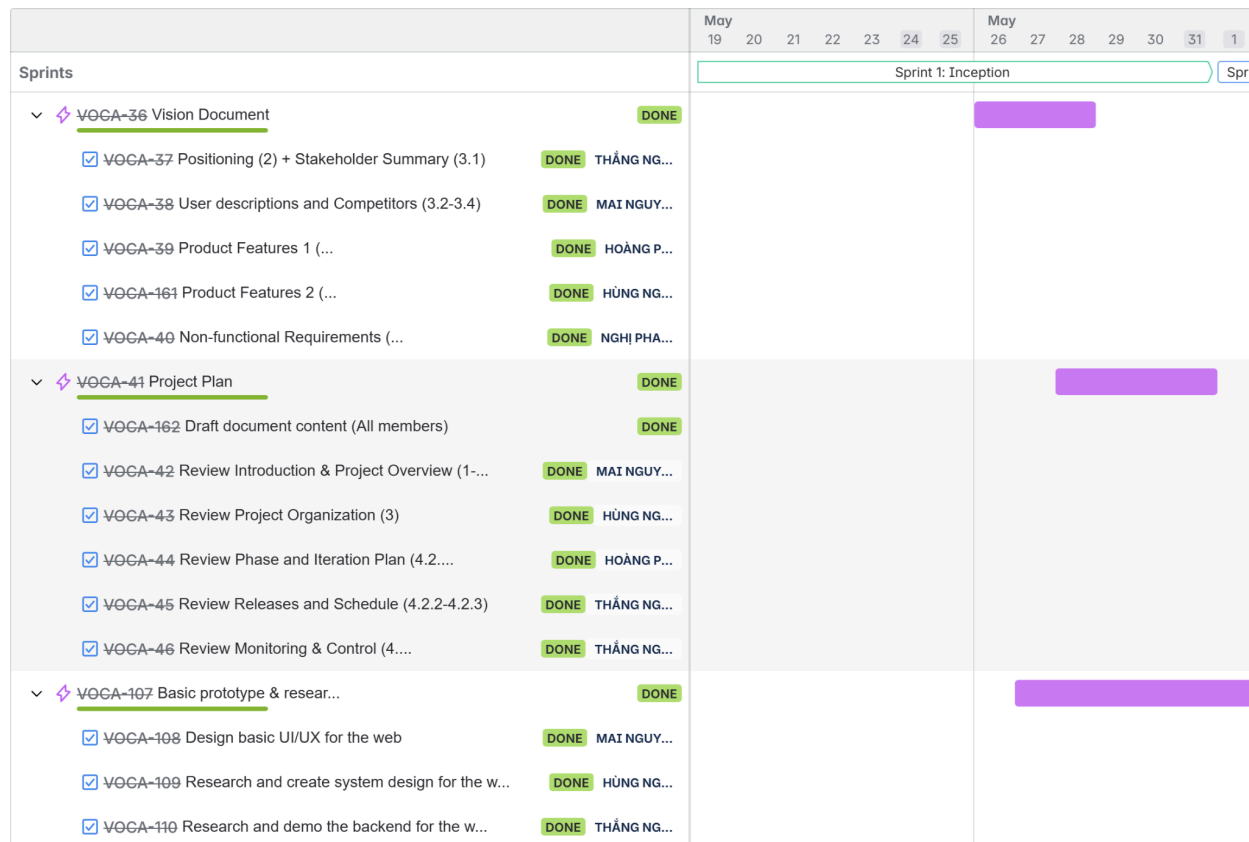
- Duration: May 19 - June 1, 2025
- Objectives:
 - Establish project plan and project vision document
 - 2 weekly reports
 - Form team and assign roles
 - Set up development environment
 - Conduct user research and interviews

Key Tasks and Assignees (as shown in Gantt chart):

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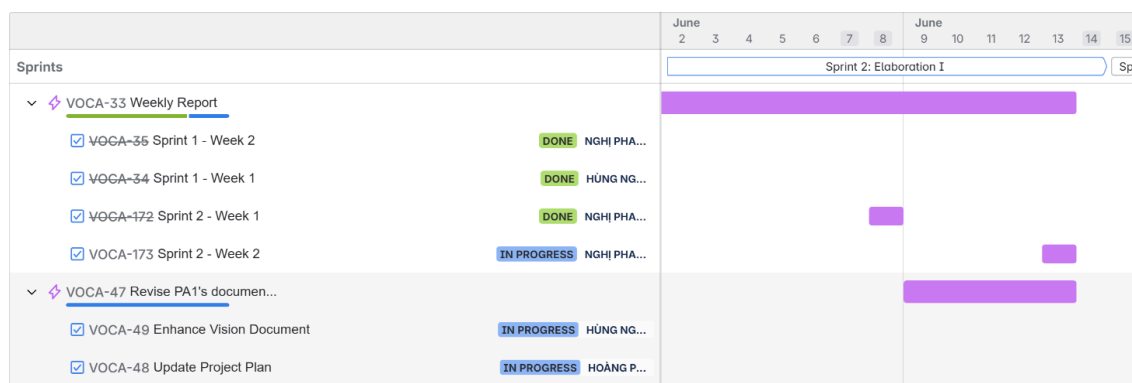
Phase 2: Elaboration (Sprints 2-3)

Duration: June 2 - June 29, 2025




Sprint 2 (June 2-15):

- Revise vision document and project plan according to TA's feedbacks
- Create use case models
- Establish use case specification
- 2 weekly reports

Key Tasks and Assignees (as shown in Gantt chart):



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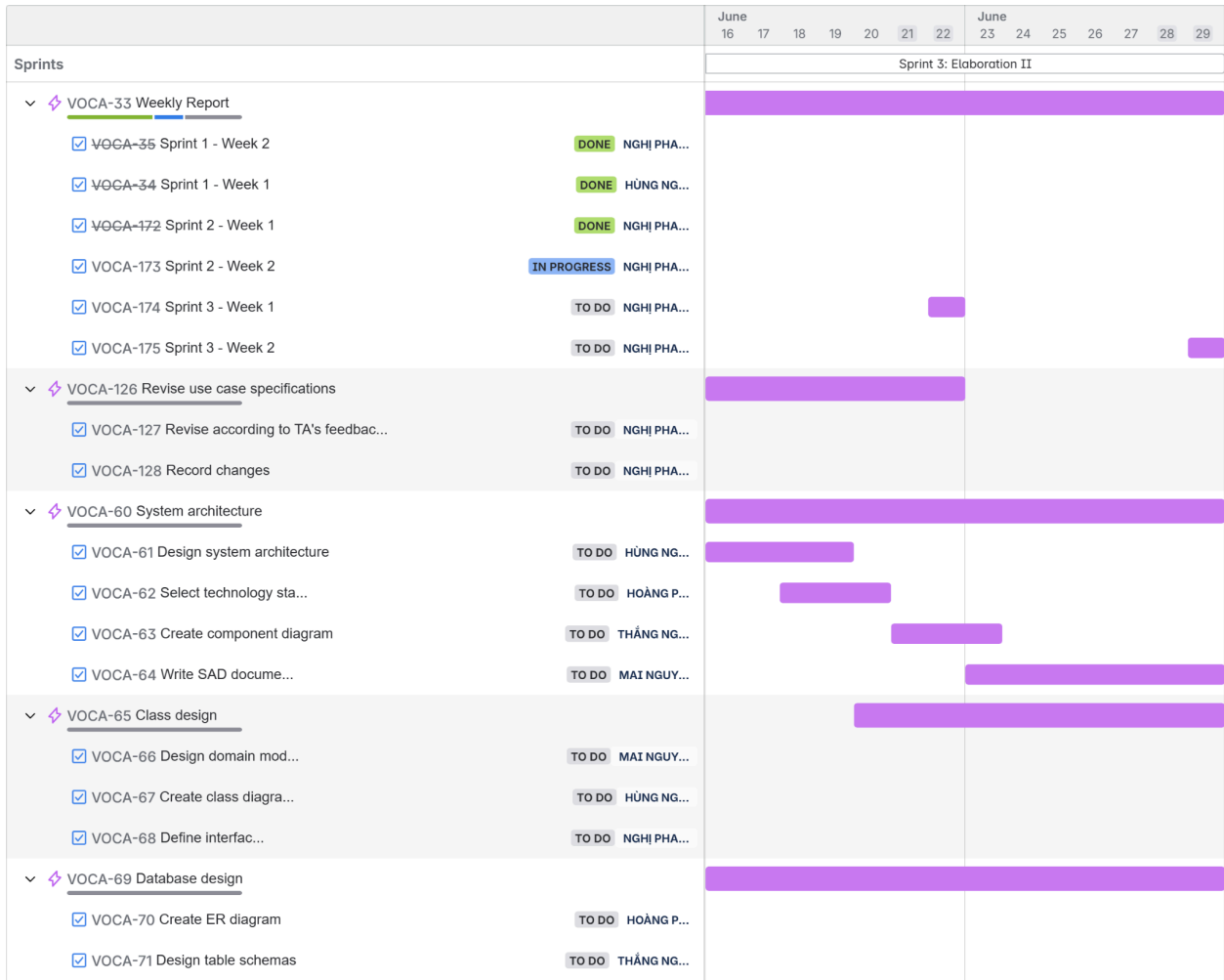
							June		June													
							2	3	4	5	6	7	8	9	10	11	12	13	14	15		
Sprints							Sprint 2: Elaboration I															Sprint 3
▼  <u>VOCA-50 Use case model</u>																						
<input checked="" type="checkbox"/> VOCA-51 Actor use cases: Learner...							DONE		MAI NGUY...													
<input checked="" type="checkbox"/> VOCA-165 Actor use cases: Learner...							DONE		HÙNG NG...													
<input checked="" type="checkbox"/> VOCA-166 Actor use cases: Learner...							DONE		THẮNG NG...													
<input checked="" type="checkbox"/> VOCA-52 Actor use cases: Teach...							DONE		HOÀNG P...													
<input checked="" type="checkbox"/> VOCA-53 Actor use cases: Ad...							DONE		NGHI PHA...													
▼  <u>VOCA-54 Use-case Specificatio...</u>																						
<input checked="" type="checkbox"/> VOCA-125 Write use case: View system analytics							DONE		NGHI PHA...													
<input checked="" type="checkbox"/> VOCA-124 Write use case: Moderate Conte...							DONE		NGHI PHA...													
<input checked="" type="checkbox"/> VOCA-122 Write use case: Ban/Unban accou...							DONE		NGHI PHA...													
<input checked="" type="checkbox"/> VOCA-121 Write use case: View classroom analyti...							DONE		HOÀNG P...													
<input checked="" type="checkbox"/> VOCA-120 Write use case: Assign exerci...							DONE		HOÀNG P...													
<input checked="" type="checkbox"/> VOCA-119 Write use case: Add/Remove studen...							DONE		HOÀNG P...													
<input checked="" type="checkbox"/> VOCA-118 Write use case: Create classroom							DONE		HOÀNG P...													
<input checked="" type="checkbox"/> VOCA-117 Write use case: Edit vocabulary list							DONE		MAI NGUY...													
<input checked="" type="checkbox"/> VOCA-116 Write use case: View vocabulary list							DONE		MAI NGUY...													
<input checked="" type="checkbox"/> VOCA-115 Write use case: Create new vocabulary li...							DONE		MAI NGUY...													
<input checked="" type="checkbox"/> VOCA-114 Write use case: Choose vocabulary list							DONE		MAI NGUY...													
<input checked="" type="checkbox"/> VOCA-113 Write use case: Review with Word Associati...							DONE		HÙNG NG...													
<input checked="" type="checkbox"/> VOCA-112 Write use case: Review with Fill-in-bla...							DONE		HÙNG NG...													
<input checked="" type="checkbox"/> VOCA-111 Write use case: Review with Flashca...							DONE		HÙNG NG...													
<input checked="" type="checkbox"/> VOCA-55 Write use case: Review vocabulary with Spaced Repetition							DONE		HÙNG NG...													
<input checked="" type="checkbox"/> VOCA-59 Write use case: View learning statisti...							DONE		THẮNG NG...													
<input checked="" type="checkbox"/> VOCA-58 Write use case: Update profi...							DONE		THẮNG NG...													
<input checked="" type="checkbox"/> VOCA-56 Write use case: Sign up							DONE		THẮNG NG...													
<input checked="" type="checkbox"/> VOCA-57 Write use case: Sign in							DONE		THẮNG NG...													
<input checked="" type="checkbox"/> VOCA-123 Write use case: Approve Teacher Reque...							DONE		NGHI PHA...													
▼  <u>VOCA-167 Review Use-case Specifications before submit</u>																						
<input checked="" type="checkbox"/> VOCA-171 Review USC19, USC20, USC21, USC22, USC...							DONE		NGHI PHA...													
<input checked="" type="checkbox"/> VOCA-170 Review USC13, USC14, USC15, USC16, USC17, USC...							DONE		THẮNG NG...													
<input checked="" type="checkbox"/> VOCA-169 Review USC7, USC8, USC9, USC10, USC11, USC...							DONE		MAI NGUY...													
<input checked="" type="checkbox"/> VOCA-168 Review USC1, USC2, USC3, USC4, USC5, USC6							DONE		HÙNG NG...													

Sprint 3 (June 16-29):

- Design system architecture
- Create detailed class diagrams
- Design database schema
- 2 weekly reports

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Key Tasks and Assignees (as shown in Gantt chart):

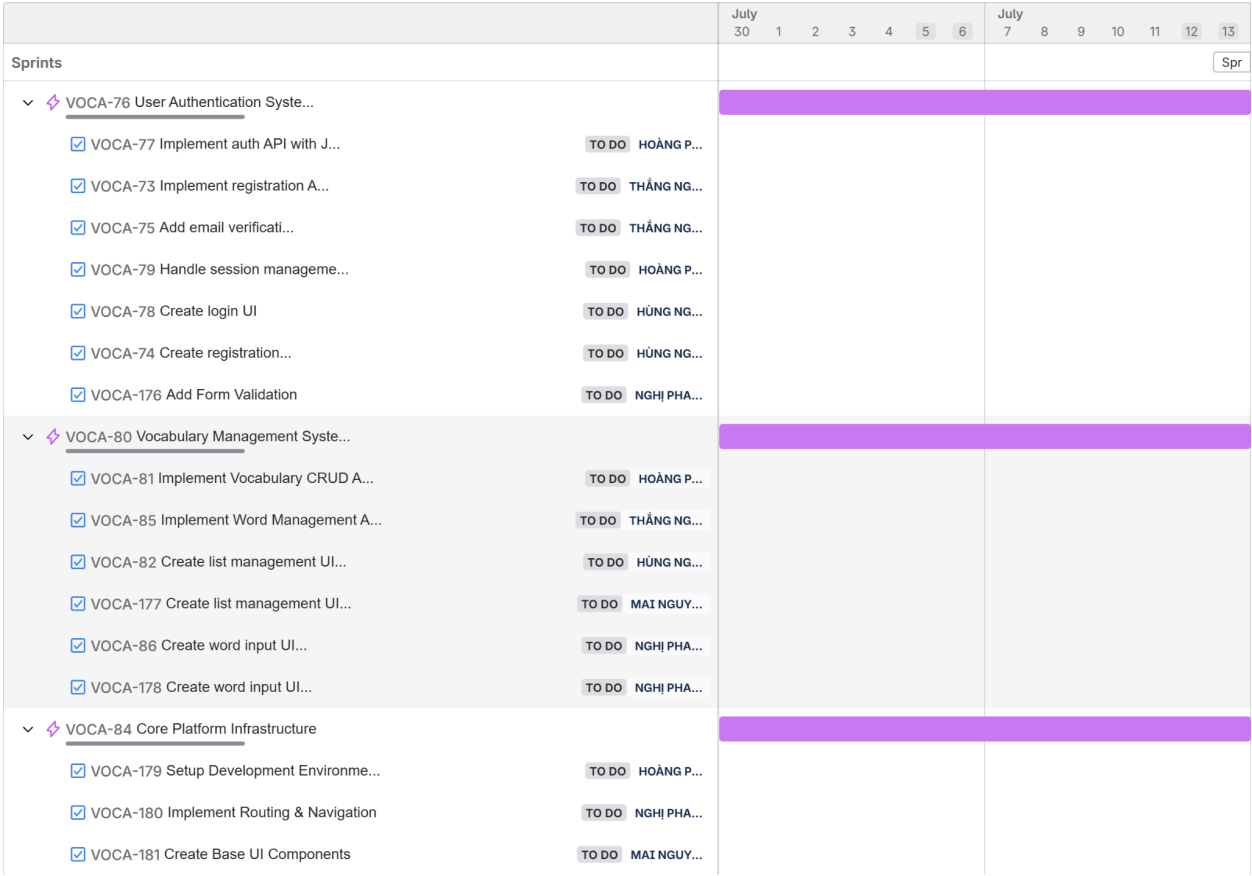


Pre-Construction Sprint (Bonus Development Period)

- Duration: June 30 - July 13, 2025
- Objectives:
 - Develop MVP features for Internal Alpha version
 - Set up development infrastructure
 - Implement basic authentication and vocabulary CRUD
 - Early integration testing
 - Note: This aligns with High School Graduation Exam period buffer

Key Tasks and Assignees (as shown in Gantt chart):

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Phase 3: Construction (Sprints 4-5)

Duration: July 14 - August 10, 2025

Sprint 4 (July 14-27):

- Implement core features
- Develop UI components
- Create test cases
- 2 weekly reports

Key Tasks and Assignees (as shown in Gantt chart):

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Sprints

VOCA-33 Weekly Report

VOCA-34 Sprint 1 - Week 1

VOCA-35 Sprint 1 - Week 2

VOCA-172 Sprint 2 - Week 1

VOCA-173 Sprint 2 - Week 2

VOCA-174 Sprint 3 - Week 1

VOCA-175 Sprint 3 - Week 2

VOCA-196 Sprint 4 - Week 1

VOCA-197 Sprint 4 - Week 2

DONE

DONE

DONE

DONE

TO DO

TO DO

TO DO

TO DO

HÙNG NG...

NGHỊ PHA...

NGHỊ PHA...

NGHỊ PHA...

NGHỊ PHA...

NGHỊ PHA...

NGHỊ PHA...

NGHỊ PHA...

VOCA-88 Create Test Plan for alpha featur...

VOCA-87 Define test strategy

VOCA-89 Design test cases...

VOCA-195 Design test cases...

VOCA-90 Set up test environment

TO DO

TO DO

TO DO

TO DO

HOÀNG R...

NGHỊ PHA...

THẮNG NG...

HOÀNG R...

VOCA-129 Revised SAD

VOCA-130 Revise according to TA's feedbac...

VOCA-131 Draw deployment diagra...

VOCA-132 Provide backend structure

TO DO

TO DO

TO DO

HÙNG NG...

NGHỊ PHA...

THẮNG NG...

VOCA-133 UI Prototype

VOCA-134 Sketch & describe Sign-in & Sign-up screen

VOCA-137 Sketch & describe Dashboard scre...

VOCA-138 Sketch & describe User Profile screen

VOCA-139 Sketch & describe Vocabulary List Management scree...

VOCA-140 Sketch & describe Classroom Management scree...

VOCA-141 Sketch & describe Admin scree...

VOCA-142 Sketch & describe Statistic screens

TO DO

TO DO

TO DO

TO DO

TO DO

TO DO

TO DO

MAI NGUY...

MAI NGUY...

MAI NGUY...

MAI NGUY...

HÙNG NG...

HÙNG NG...

HÙNG NG...

VOCA-91 Spaced Repetition Learning Engi...

VOCA-92 Implement SM-2 algorithm 1

VOCA-183 Implement SM-2 algorithm 2

VOCA-184 Create Learning Session A...

TO DO

TO DO

TO DO

THẮNG NG...

HOÀNG R...

THẮNG NG...

VOCA-95 Learning Methods Implementation

VOCA-97 Implement Flashcard Learning Mode 1

VOCA-185 Implement Flashcard Learning Mode 2

VOCA-99 Implement Fill-in-blank Learning Mode 1

VOCA-186 Implement Fill-in-blank Learning Mode 2

VOCA-187 Implement Word Association Mode...

VOCA-188 Implement Word Association Mode...

TO DO

TO DO

TO DO

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TO DO

TO DO

HÙNG NG...

MAI NGUY...

NGHỊ PHA...

THẮNG NG...

MAI NGUY...

HOÀNG R...

Sprint 4: Construction I

Sprint 5: Deployment I

<

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<div> <div>VOCA-189 Teacher Classroom Features</div> <div> <div>VOCA-190 Implement Classroom Management A...</div> <div>TO DO HOÀNG P...</div> </div> <div> <div>VOCA-191 Implement Assignment Syste...</div> <div>TO DO THẮNG NG...</div> </div> <div> <div>VOCA-192 Create Teacher Dashboa...</div> <div>TO DO HÙNG NG...</div> </div> <div> <div>VOCA-193 Create Student Classroom View</div> <div>TO DO NGHỊ PHA...</div> </div> </div>		
<div> <div>VOCA-101 Testing & Quality Assurance for alpha versi...</div> <div> <div>VOCA-102 Execute manual testing (All team members)</div> <div>TO DO</div> </div> <div> <div>VOCA-103 Set up automated testing</div> <div>TO DO THẮNG NG...</div> </div> <div> <div>VOCA-104 Fix identified frontend defects</div> <div>TO DO HÙNG NG...</div> </div> <div> <div>VOCA-182 Fix identified backend defec...</div> <div>TO DO HOÀNG P...</div> </div> </div>		

Sprint 5 (July 28 - August 10):

- Complete feature implementation
- Conduct comprehensive testing
- Prepare deployment
- Project presentation
- 2 weekly reports

Key Tasks and Assignees (as shown in Gantt chart):

	July	28	29	30	31	1	2	3	August	4	5	6	7	8	9	10
Sprints	Sprint 5: Construction II															
<div> <div>VOCA-212 Sprint 5 - Week 1</div> <div>TO DO</div> </div>																
<div> <div>VOCA-213 Sprint 5 - Week 2</div> <div>TO DO</div> </div>																
<div> <div>VOCA-148 Advanced Featur...</div> <div> <div>VOCA-149 Implement AI Example Generation...</div> <div>TO DO HOÀNG P...</div> </div> <div> <div>VOCA-198 Implement AI Example Generation...</div> <div>TO DO HÙNG NG...</div> </div> <div> <div>VOCA-199 Enhanced Search & Discovery</div> <div>TO DO THẮNG NG...</div> </div> </div>																
<div> <div>VOCA-200 Performance & Security</div> <div> <div>VOCA-201 Performance Optimization 1</div> <div>TO DO HOÀNG P...</div> </div> <div> <div>VOCA-202 Performance Optimization 2</div> <div>TO DO HÙNG NG...</div> </div> <div> <div>VOCA-203 Security Hardeni...</div> <div>TO DO THẮNG NG...</div> </div> </div>																
<div> <div>VOCA-154 Automated testing</div> <div> <div>VOCA-155 API Automated Testi...</div> <div>TO DO THẮNG NG...</div> </div> <div> <div>VOCA-204 Setup Automated Testing Framework...</div> <div>TO DO MAI NGUY...</div> </div> <div> <div>VOCA-205 Setup Automated Testing Framework...</div> <div>TO DO NGHỊ PHA...</div> </div> </div>																
<div> <div>VOCA-105 Final Documentation & Presentati...</div> <div> <div>VOCA-106 Create Project Presentation (All team members)</div> <div>TO DO</div> </div> <div> <div>VOCA-206 Finalize Architecture Documentati...</div> <div>TO DO HÙNG NG...</div> </div> <div> <div>VOCA-207 Prepare Demo Environment</div> <div>TO DO HOÀNG P...</div> </div> </div>																
<div> <div>VOCA-208 Final Quality Assuran...</div> <div> <div>VOCA-209 Execute Final Test Suite (All team member...</div> <div>TO DO</div> </div> <div> <div>VOCA-211 Bug Fixes & Final Polish (All team members)</div> <div>TO DO</div> </div> </div>																

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4.2.2 Releases

Release	Type	Date	Features
v0.1	Internal Alpha	July 13, 2025	Basic authentication, vocabulary list CRUD
v0.2	Internal Beta	July 27, 2025	Spaced Repetition engine, learning modes
v1.0	Final Release	August 10, 2025	All features complete with testing

4.2.3 Project Schedule

Key Milestones:

1. **Project Kickoff** - May 19, 2025
2. **Requirements Complete** - June 15, 2025
3. **Core Features Implemented** - July 27, 2025
4. **Project Completion** - August 10, 2025

Weekly Schedule:

- **Monday & Wednesday:** Offline meeting at library, documentation work (3 hours)
- **Tuesday:** Documentation and planning
- **Thursday & Friday:** Development work (4 hours/day)
- **Saturday:** Self-study and research
- **Sunday:** Sprint review and retrospective meeting

4.3 Project Monitoring and Control

4.3.1 Reporting

Communication Plan:

1. **Offline Meetings** (Monday & Wednesday at Library & optional meeting)
 - Duration: 3 hours per session
 - Focus: Sprint planning, task coordination, pair programming
 - Documentation review and updates
 - Problem-solving sessions
2. **Sprint Review Meeting** (Sunday)
 - Full team retrospective
 - Demo of completed features
 - Planning for next sprint
 - Performance evaluation
3. **Documentation Days** (Thursday)
 - Individual documentation work
 - Async collaboration via Google Docs
 - Comment and review cycles
4. **Emergency Communication**
 - Discord for urgent issues
 - Phone calls for critical blockers
 - Response time: within 2 hours during working hours

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4.3.2 Risk Management

Risk ID	Risk Description	Probability	Impact	Risk Exposure	Priority	Mitigation Strategy or Contingency Plan
R1	Team member unavailability due to other courses	High (3)	High (3)	9	Critical	<ul style="list-style-type: none"> • Create detailed documentation • Cross-train team members • Maintain task buffer
R2	Technical complexity of Spaced Repetition algorithm	Medium (2)	High (3)	6	High	<ul style="list-style-type: none"> • Research existing implementations • Start implementation early • Have fallback simplified version
R3	Integration issues between frontend and backend	Medium (2)	Medium (2)	4	Medium	<ul style="list-style-type: none"> • Define clear API contracts early • Use API documentation tools • Regular integration testing
R4	Scope creep from additional feature requests	High (3)	Medium (2)	6	High	<ul style="list-style-type: none"> • Strict change control process • Focus on MVP features • Document nice-to-have features for future
R5	Performance issues with large vocabulary sets	Low (1)	High (3)	3	Medium	<ul style="list-style-type: none"> • Implement pagination • Database optimization • Caching strategies
R6	Limited testing time before final submission	Medium (2)	High (3)	6	High	<ul style="list-style-type: none"> • Implement automated testing • Continuous testing throughout development • Prioritize critical path testing
R7	External API dependency failure (Gemini AI)	Low (1)	Medium (2)	2	Low	<ul style="list-style-type: none"> • Fallback static examples • API error handling • Local caching
R8	Database storage limit exceeded (Supabase free tier)	Medium (2)	Medium (2)	4	Medium	<ul style="list-style-type: none"> • Data optimization • Archive old data • Monitor usage closely

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Risk Scoring Matrix:

- Probability: Low (1), Medium (2), High (3)
- Impact: Low (1), Medium (2), High (3)
- Risk Exposure = Probability × Impact
- Priority: Low (1-2), Medium (3-4), High (6), Critical (9)

4.3.3 Configuration Management

Repository Structure:

```

/Intro2SE-23CLC06-Group06
├── /frontend (React application)
├── /backend (Node.js/Express API)
├── /database (Supabase schemas)
├── /docs (Project documentation)
├── /tests (Test suites and scripts)
└── /deployment (Configuration files)

```

Version Control:

- Repository: GitHub (<https://github.com/itshoang2024/Intro2SE-23CLC06-Group06.git>)
- Branching Strategy: Git Flow
 - `main`: Production-ready code
 - `develop`: Integration branch
 - `feature/*`: Individual feature branches
 - `hotfix/*`: Emergency fixes

Code Review Process:

1. All code must be reviewed before merging
2. At least one approval required

Change Management:

- All changes must be tracked in JIRA
- Major changes require team consensus
- Change impact analysis required for scope changes