
STUDENT EXPERIENCES AND OPINIONS ON
THE PRACTICAL APPLICATION OF SOFTWARE
ENGINEERING METHODS AND
TECHNOLOGIES IN INDUSTRY: CASE STUDIES
IN *SW ROMANIA – OLTENIA AND ALBANIA*

Costin Bădică, Amelia Bădică,
Elinda Kajo Meçe, Cristinel Ungureanu

University of Craiova, Romania
Polytechnic University of Tirana, Albania

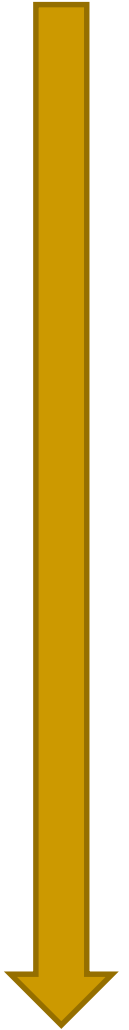
Cooperation at Academic Informatics Education across Balkan Countries and Beyond

Hvar, Croatia, September 2-6, 2019

September 02, 2019

Outline

- Introduction and Motivation
- Target Audience
- Questionnaire Structure
- Results
- Discussion
- Conclusions



Aim & Method



- Aim: Better guidance of CS students in SE education based on real-life practical requirements by aligning academic education with practical requirements specific to real-life SE projects.
- Method: Collect and analyze data about the real experiences and opinions of students on the practical applicability of current software methodologies and technologies in IT industries.

Target Audience



- Romanian students group: ~450 students
 - 1st, 2nd, 3rd year CS bachelor students: ~350 students
 - 1st and 2nd year SE and ISB master students: ~100 students
 - Invitation email to participate was sent via Google Classroom

- Albanian students group: ~250 students

Questionnaire response



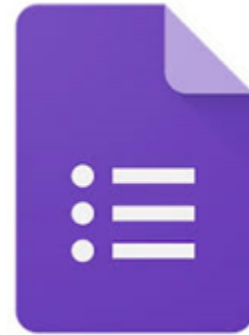
- 68 responses distributed:
 - Romania: 46
 - Albania: 22 (1 in Sofia)
- Age:
 - 67: 19 – 26
 - 1: 34
- Gender:
 - 33.8 % female
 - 66.2 % male
- Students: 89.6 %
- Graduates: 10.4%

Questionnaire Structure



- Preliminaries
 - 13 questions
- Software Engineering Methods
 - 5 questions
- Software Methodologies
 - 17 questions
- School and Career
 - 8 questions
- Total: 43 (initial questionnaire had 20 questions)

Questionnaire Implementation



← Student Experiences and Opinions on SEND

QUESTIONS RESPONSES 68

Section 2 of 5

Software Engineering Methods

Please answer the following questions about a particular software you are developing/have developed

Types of architecture used in your current project in which you are involved *

- Web
- Embedded
- Desktop
- Enterprise
- Other...

Which of the following categories best describes the type of Software *

- Desktop

Questionnaire – Preliminaries

- Company name
- Job title
- Company location
- No. of employees
- Company objective
- Age
- Level of education
- Future education plans
- Gender
- Student or graduated?
- Years of employment
- Work experience
- Project fulltime staff

Questionnaire - Methods

- Types of architecture
- Software type / category
- Project application domain
- Duration of involvement in the project
- Team Work ?

Questionnaire - Methodologies

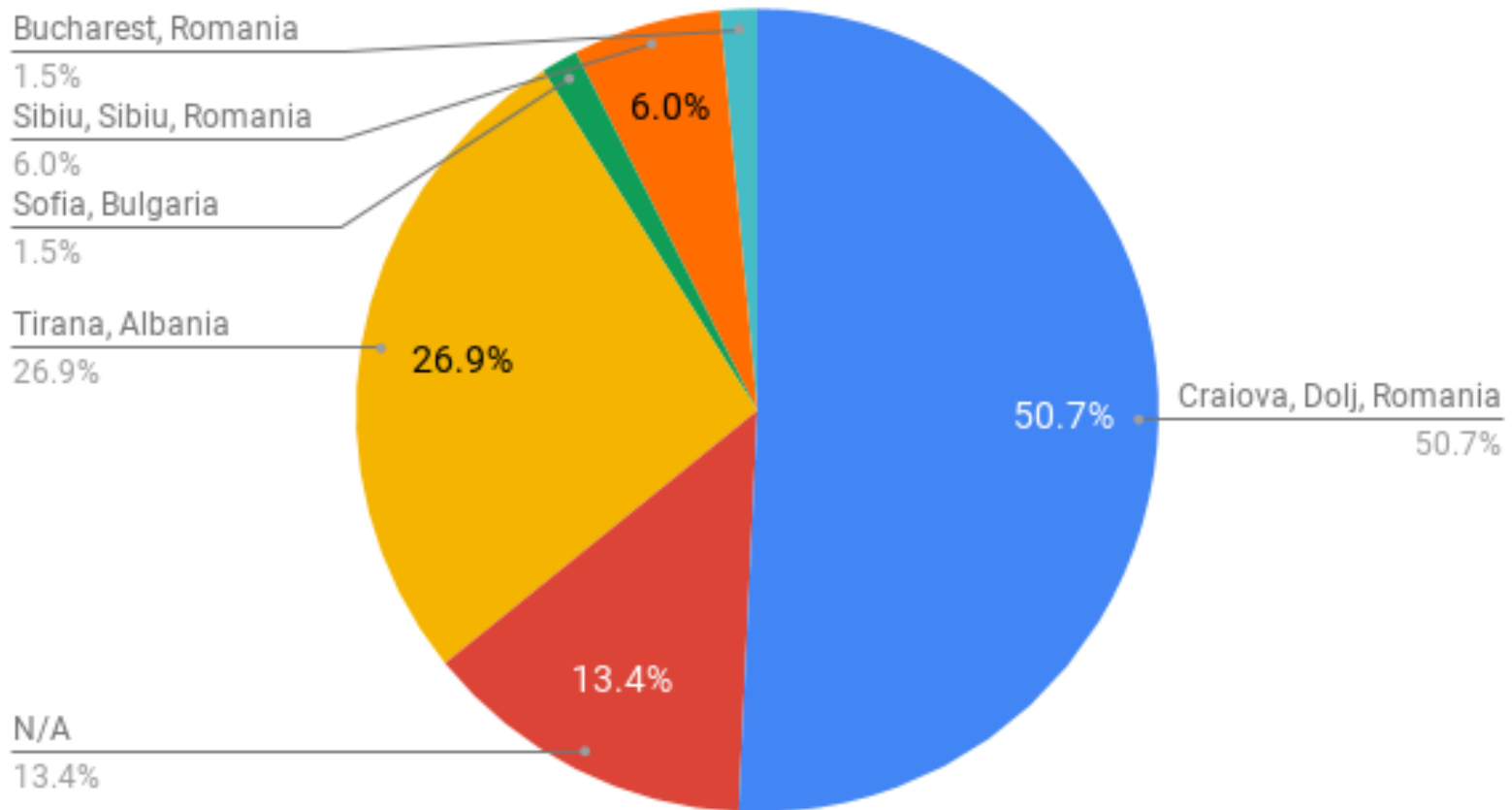
- Size of project as lines of code
- Software Quality Management approaches
- Development life-cycle management
- Analysis and design approaches
- Modeling notation
- Tools to complete your work
- Period of new version release
- Automated testing / Continuous Integration / Continuous Delivery
- Notation of requirements specification
- Software Quality and Software Productivity
- Appropriate management of software quality
- Your position in the project
- Testing methods
- Maintenance
- Your roles
- Multiple simultaneous roles

Overview – School and Career

- Project help to better understand academic subjects.
- Academic project help to better develop practical projects.
- Involvement by company in training courses?
- Learning focus when hired.
- Competencies needed in your company.
- Skills learned during practical projects that need better approach in school.
- Skills that would have been helpful being learned in the school.
- Expectance of more career guidance at school.

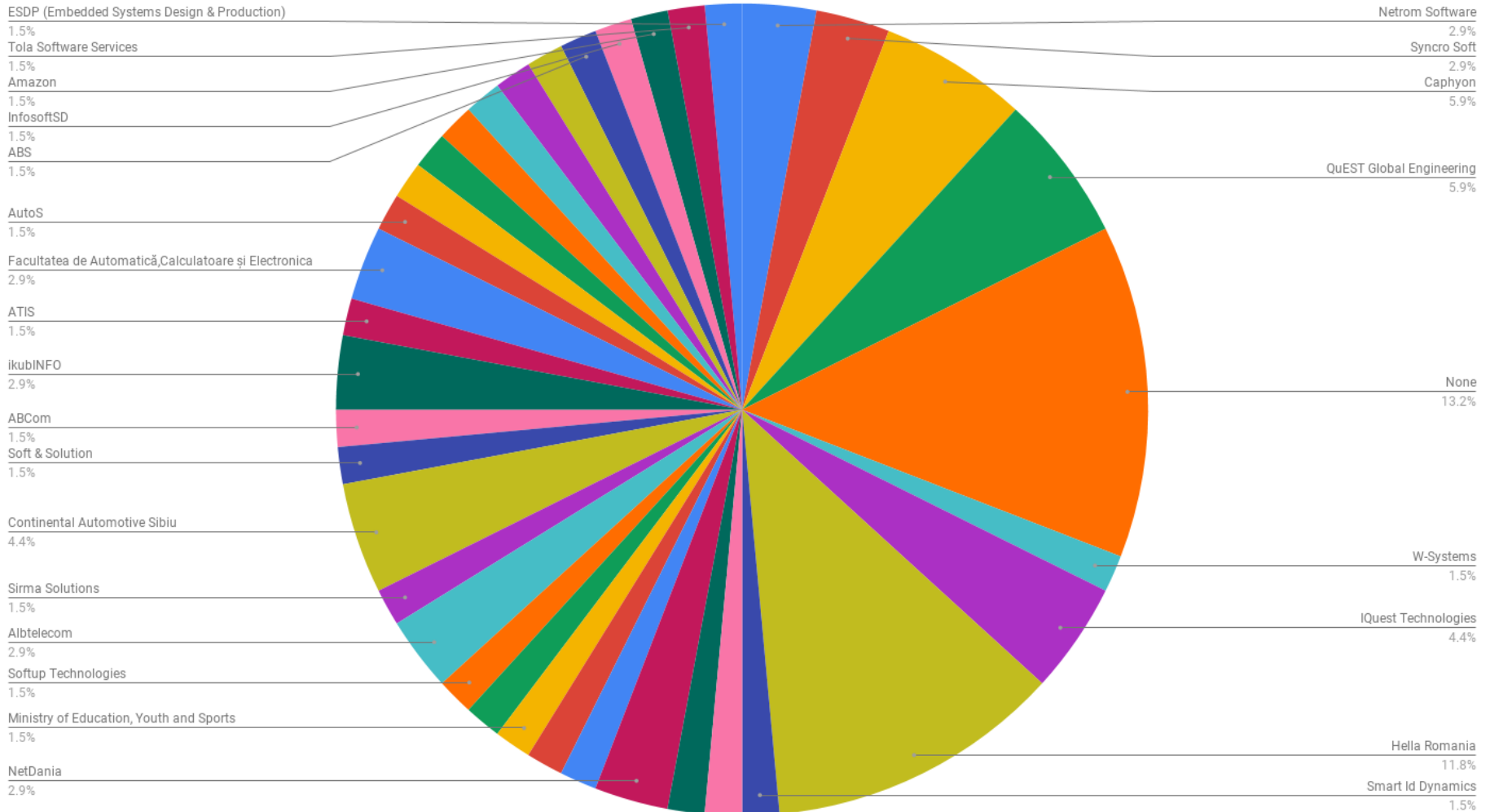
Company location

Where is your company located (city/province/country)?



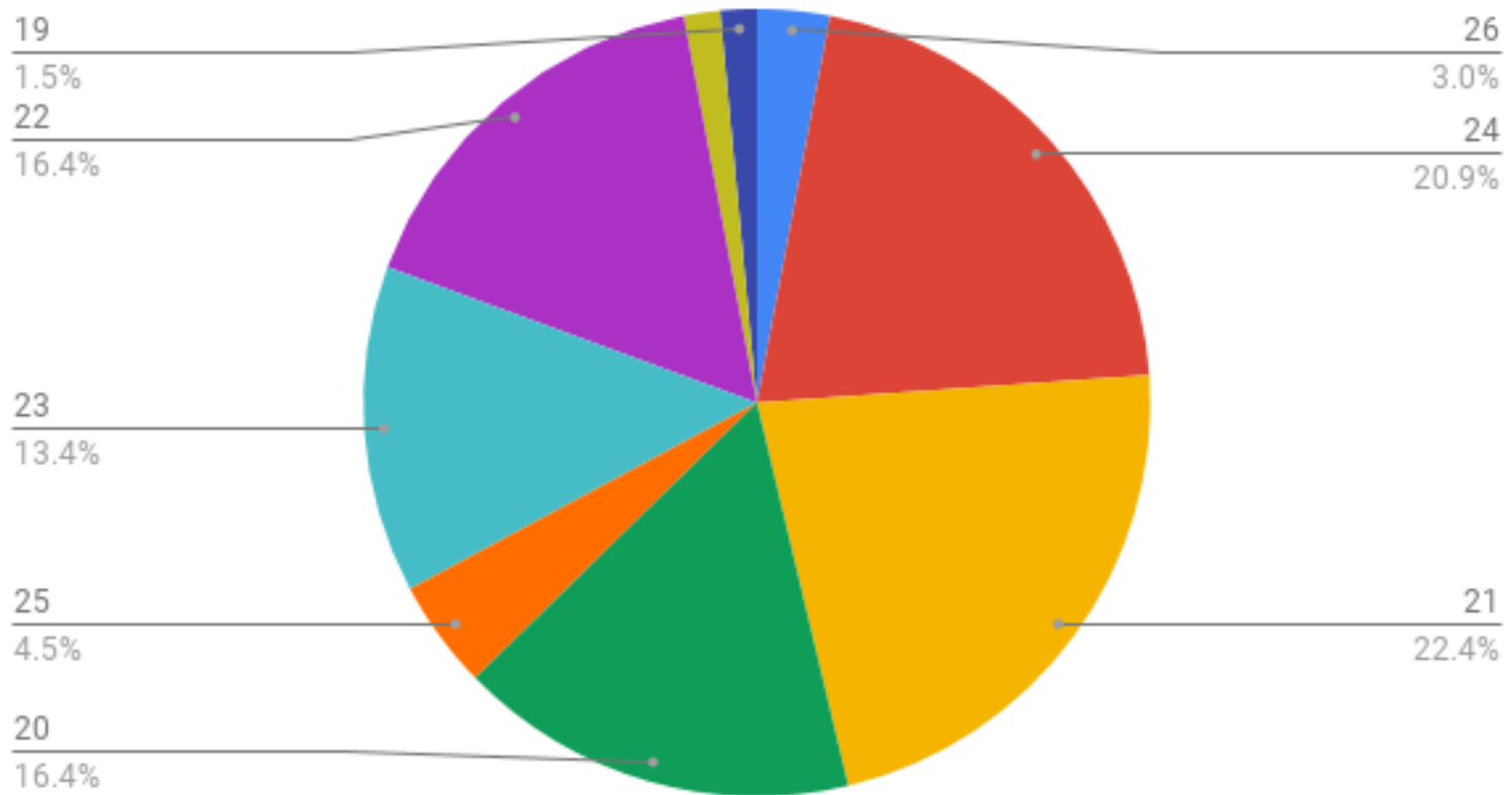
Company name

Company name



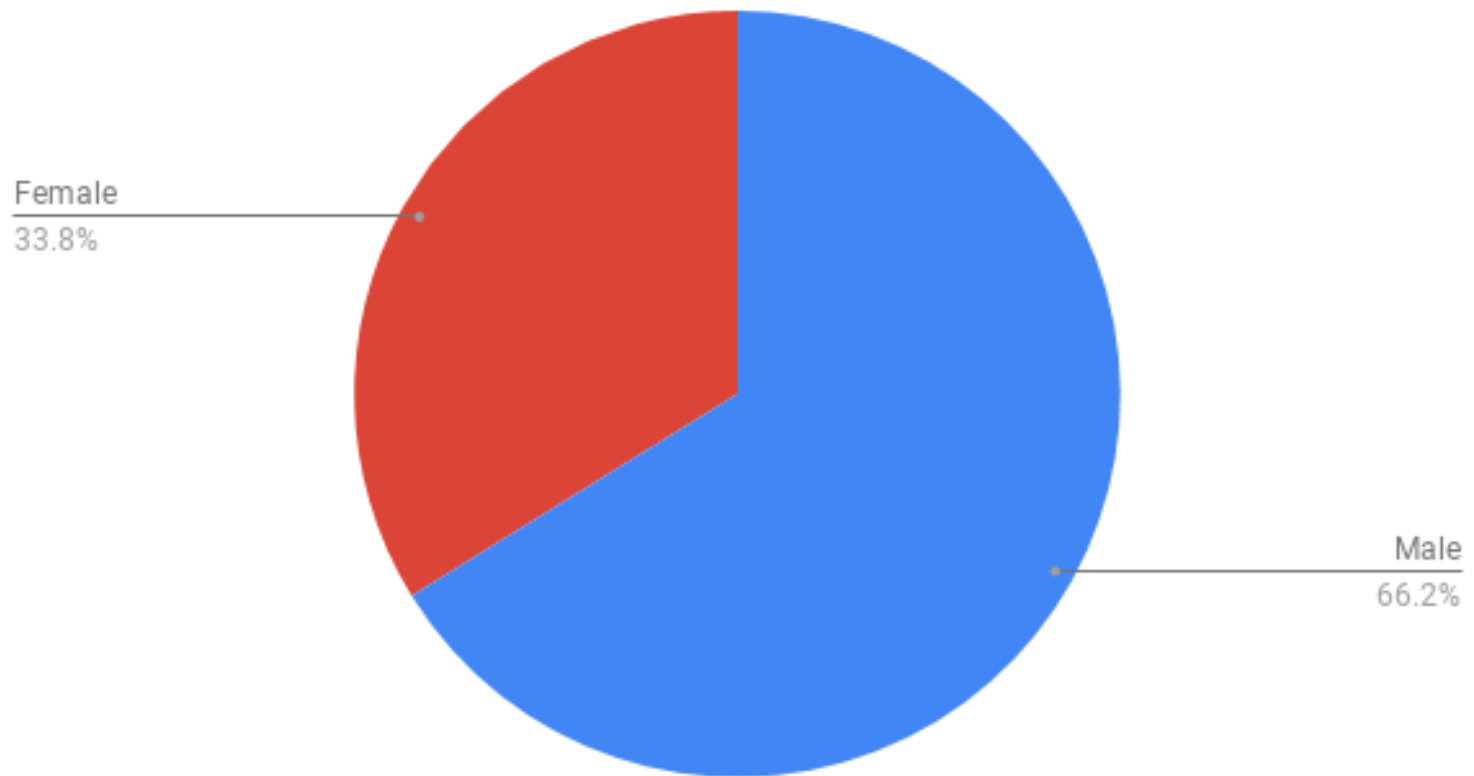
Age

What is your age?



Gender

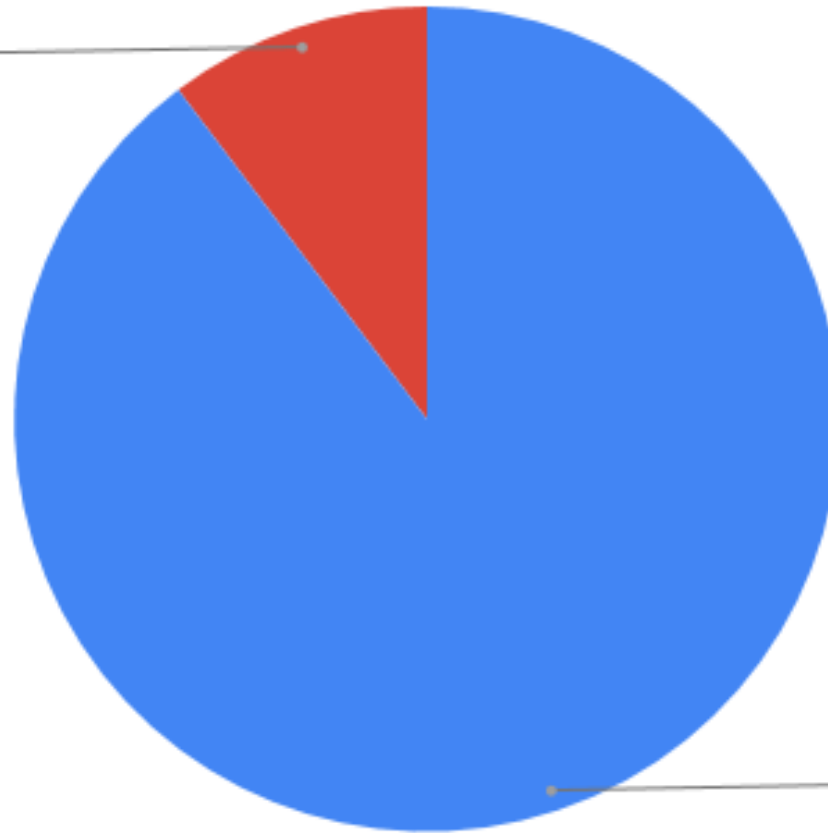
Gender



Still a student?

Are you still a student or have you graduated?

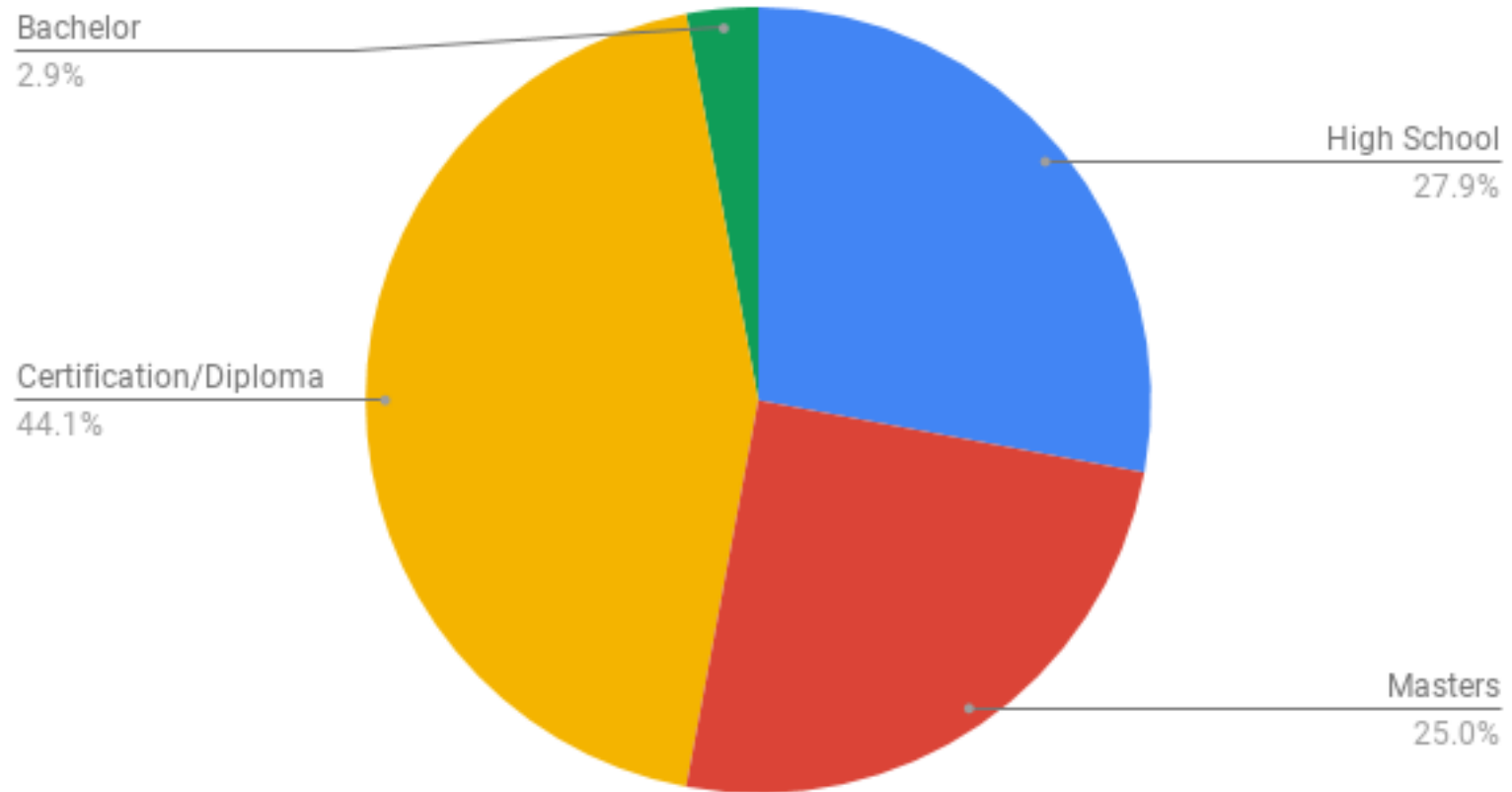
I have graduated
10.3%



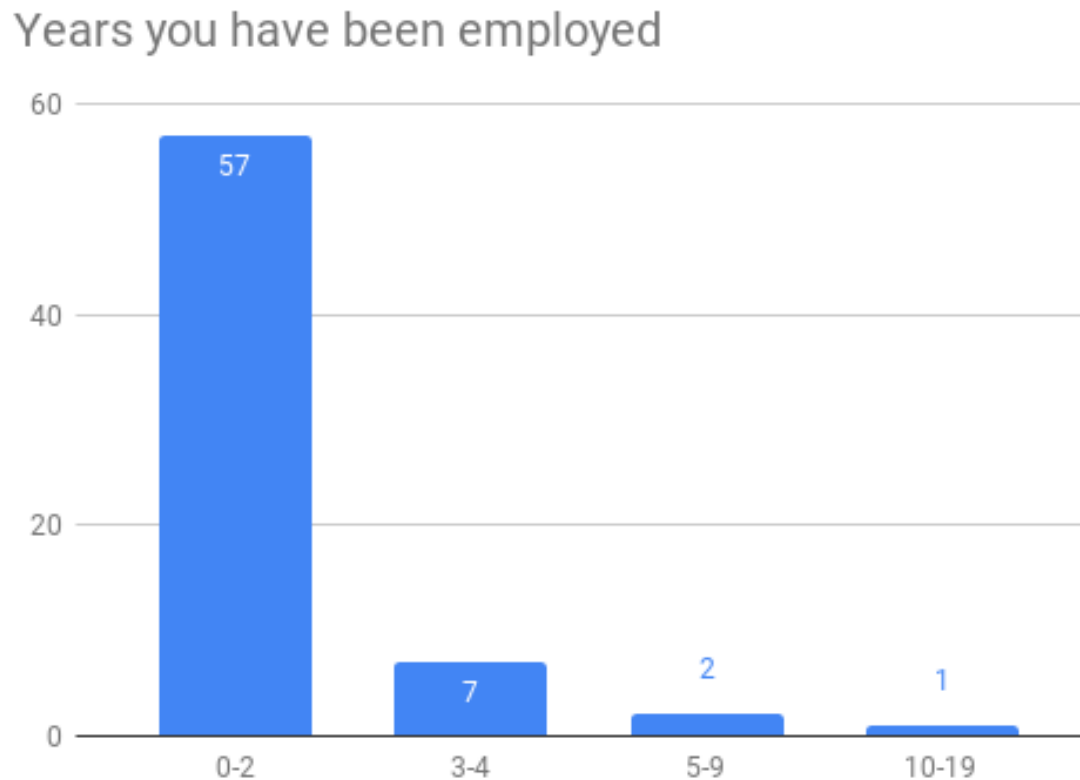
I am still a student
89.7%

Level of education

Current Level of Education

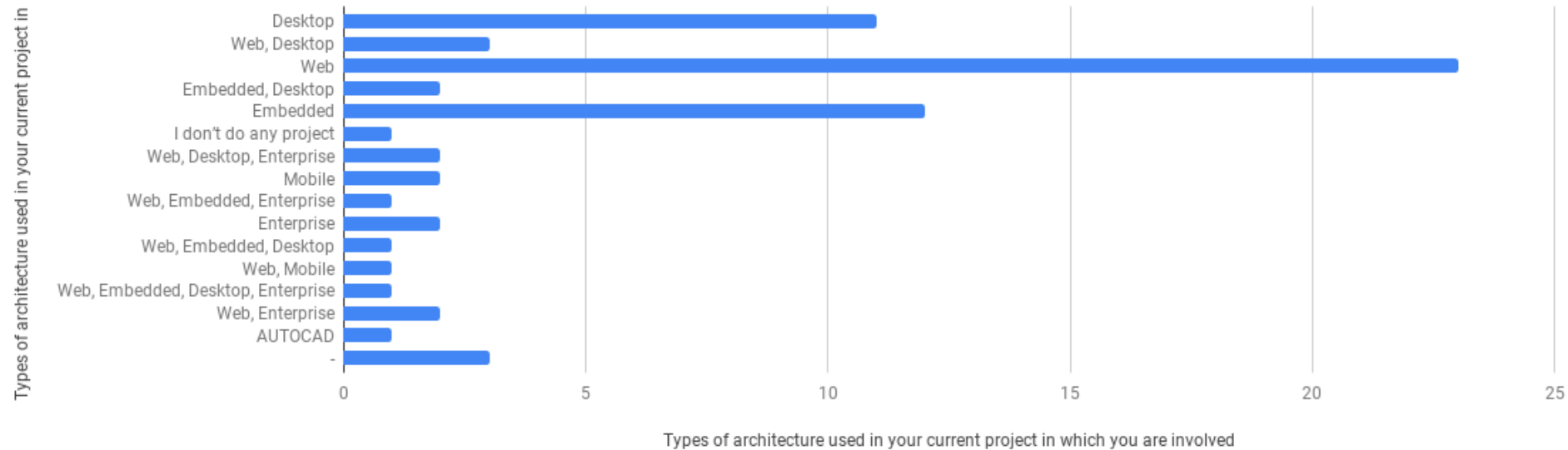


Years of employment



Type of architecture

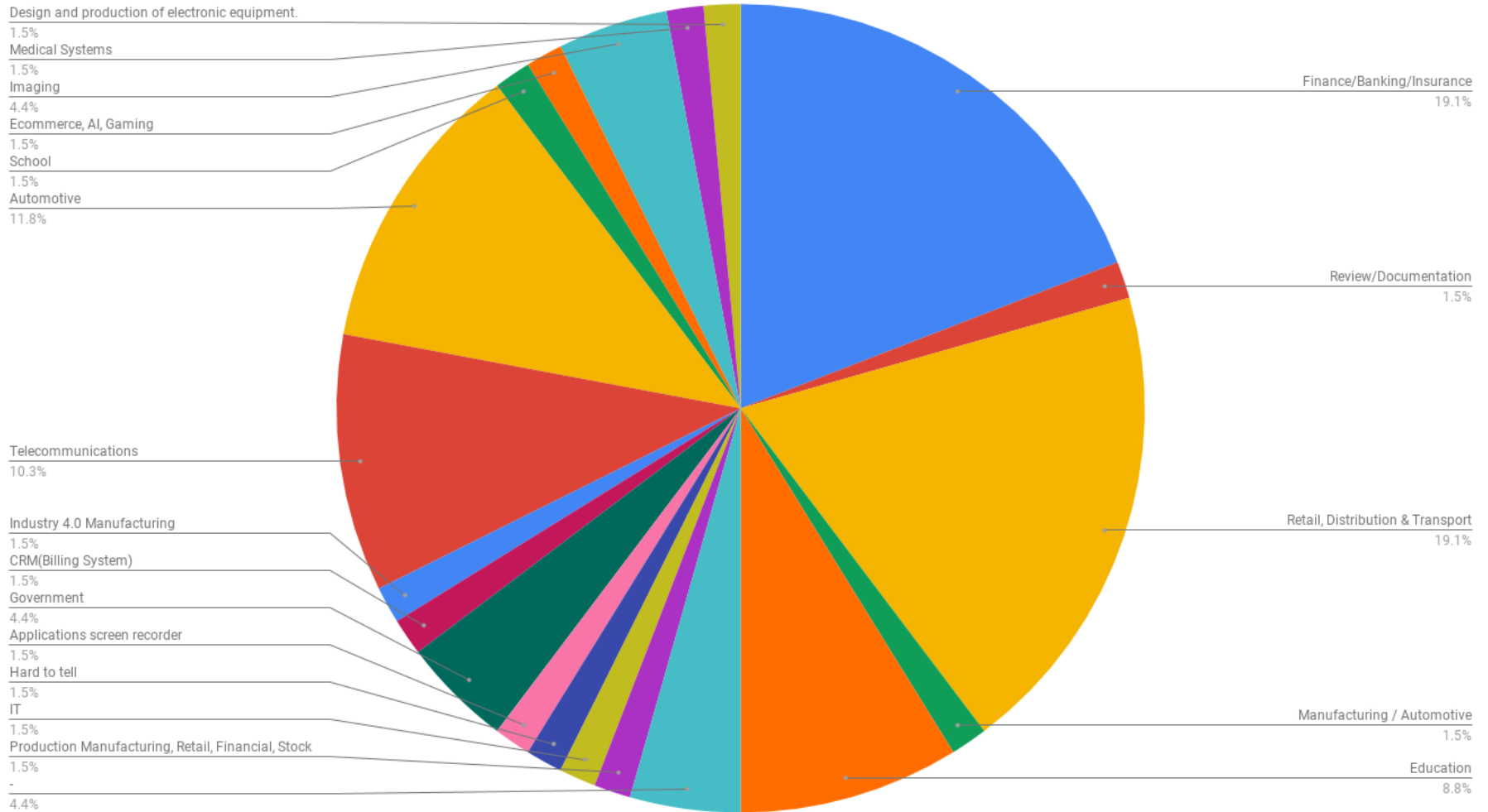
Types of architecture used in your current project in which you are involved



Web, Embedded, Desktop, Enterprise, Other

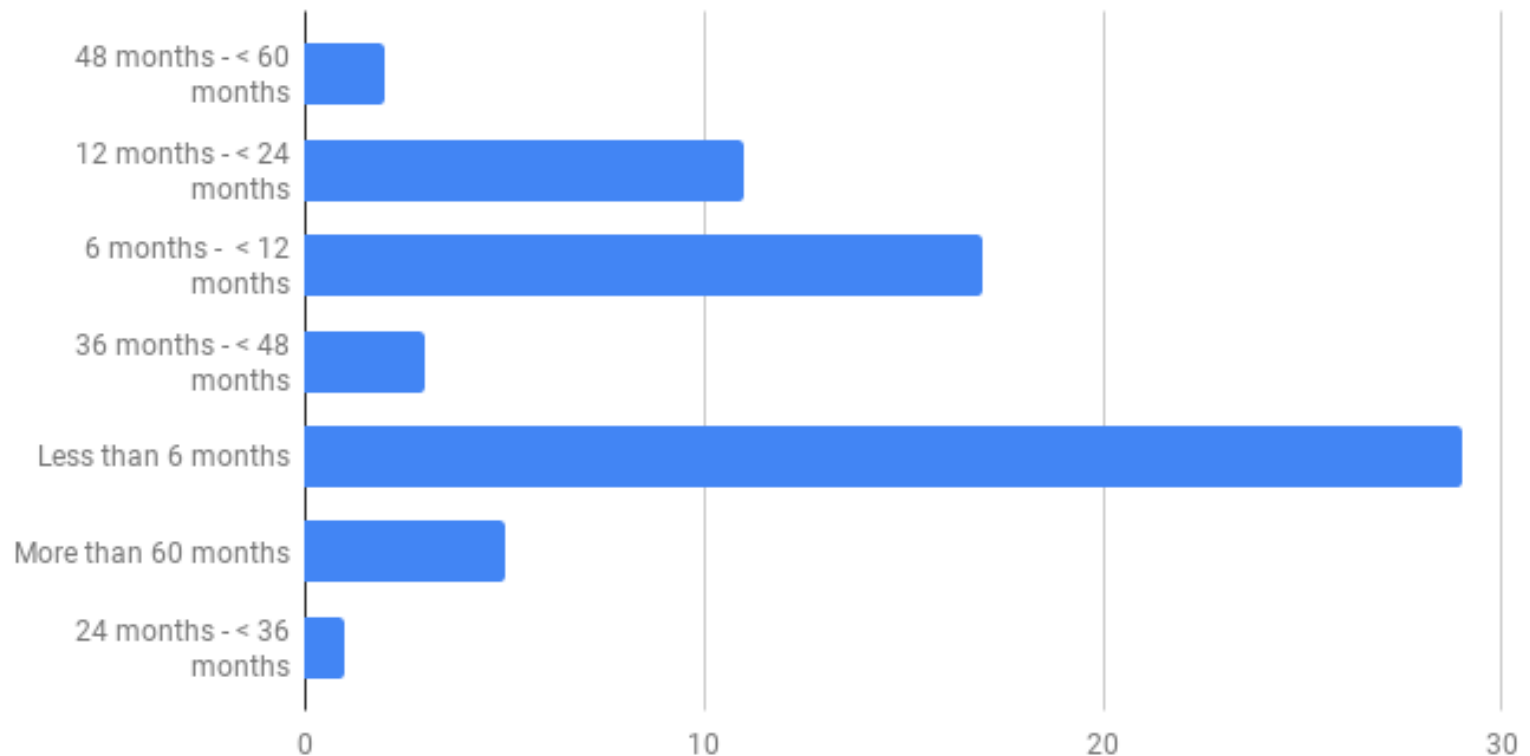
Application domain

Which of the following application domains does/did this project apply to?



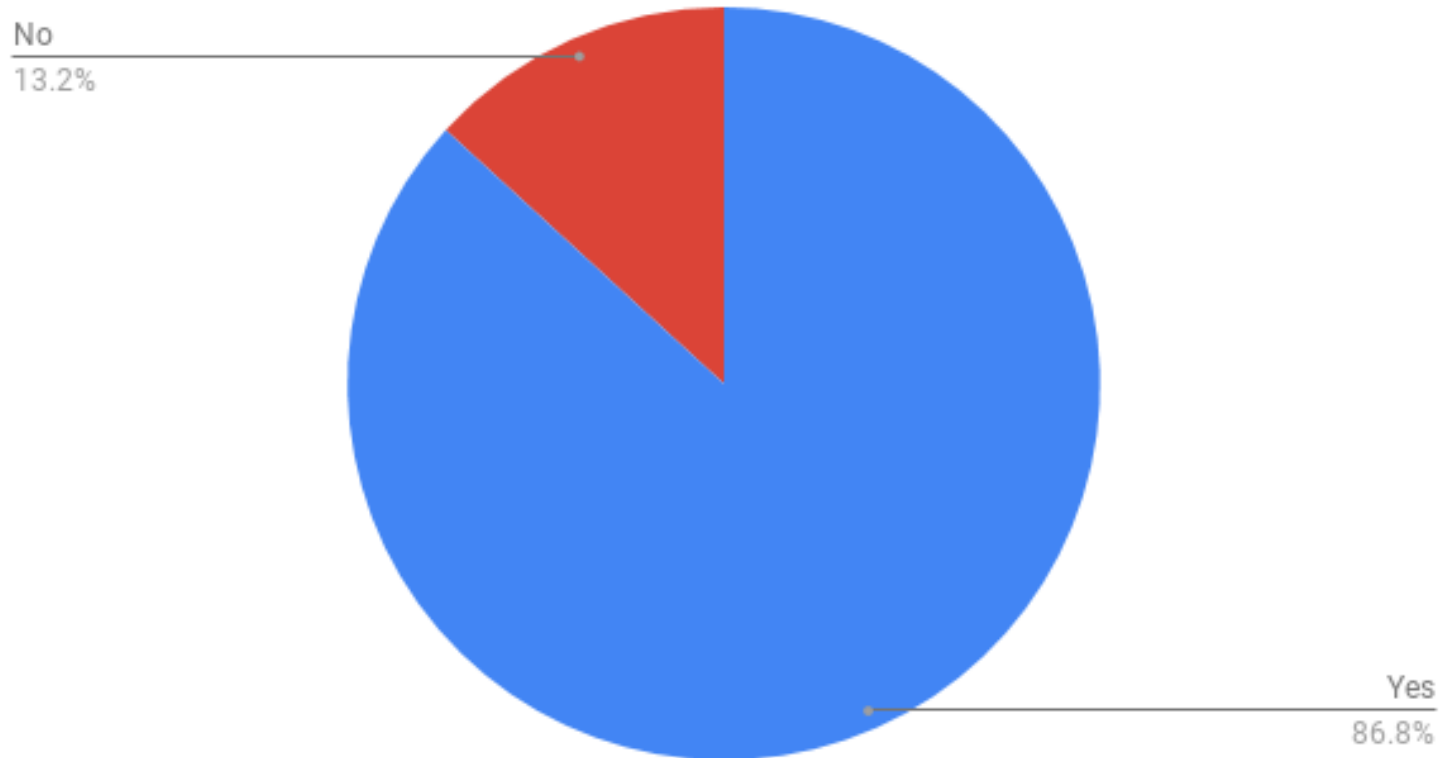
Project duration

What is/was the duration of the project you are involved or were last involved in?



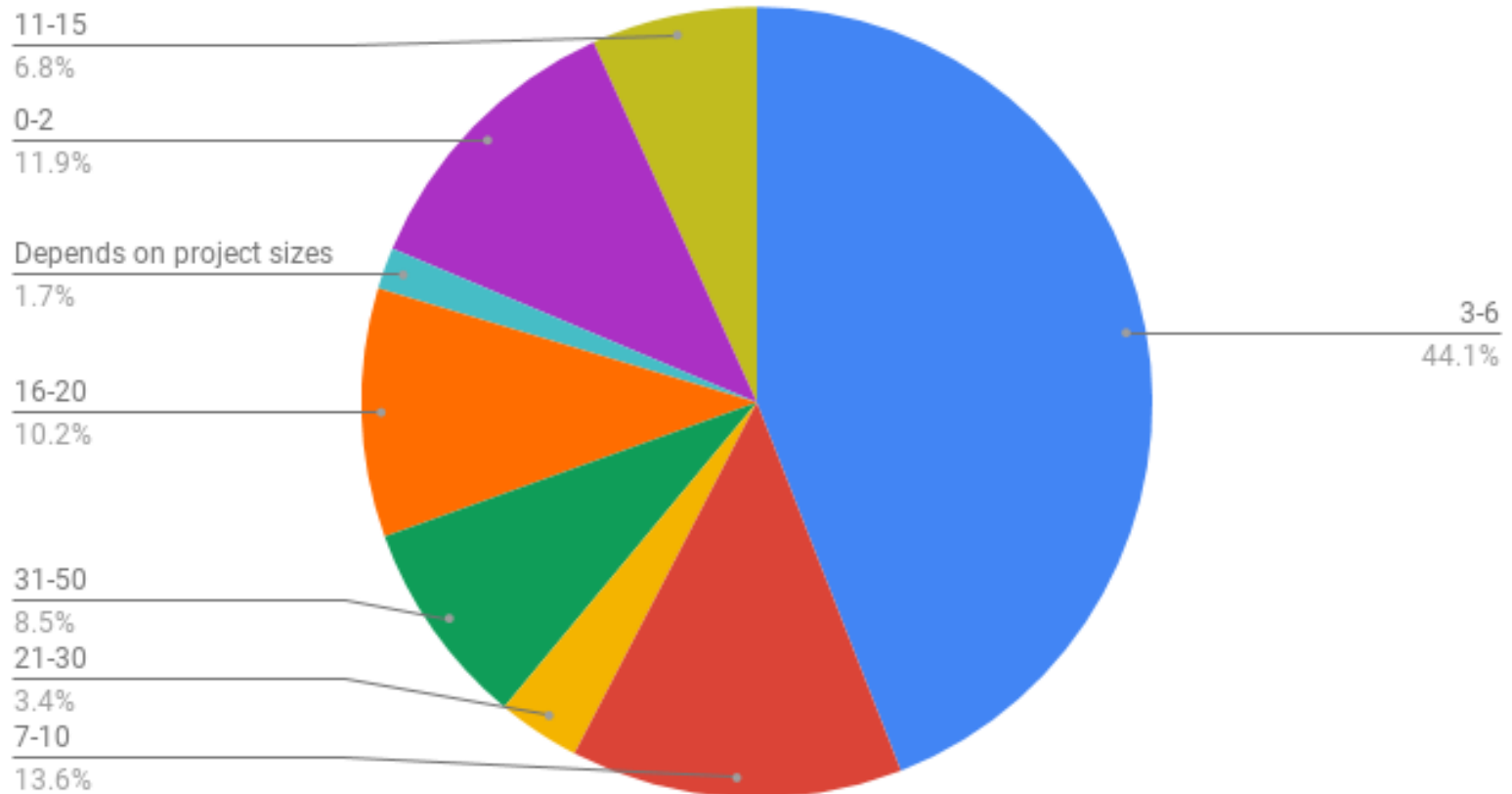
Team work

Did you work/Are you working in a team in this project?



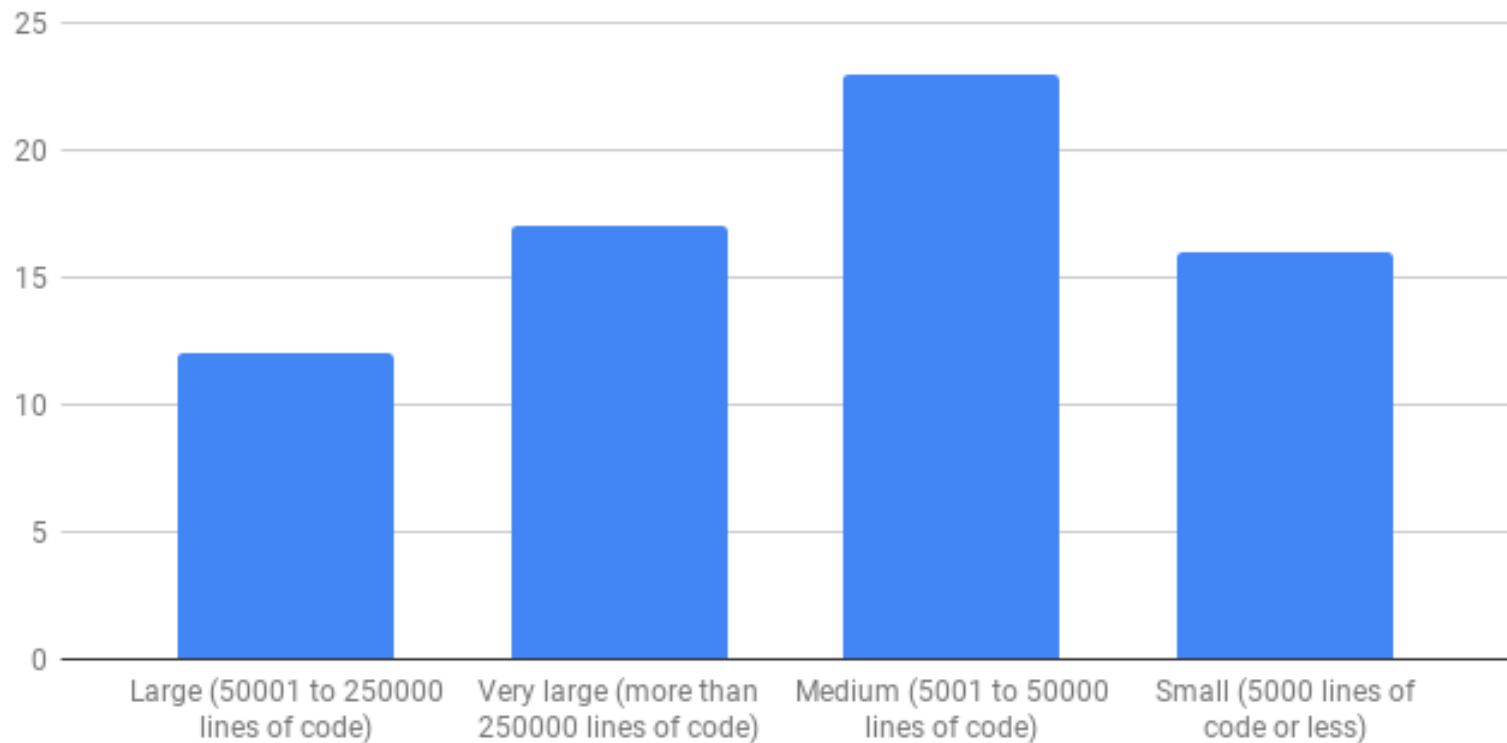
Staff involved

How many full time staff are/were involved in the project altogether?



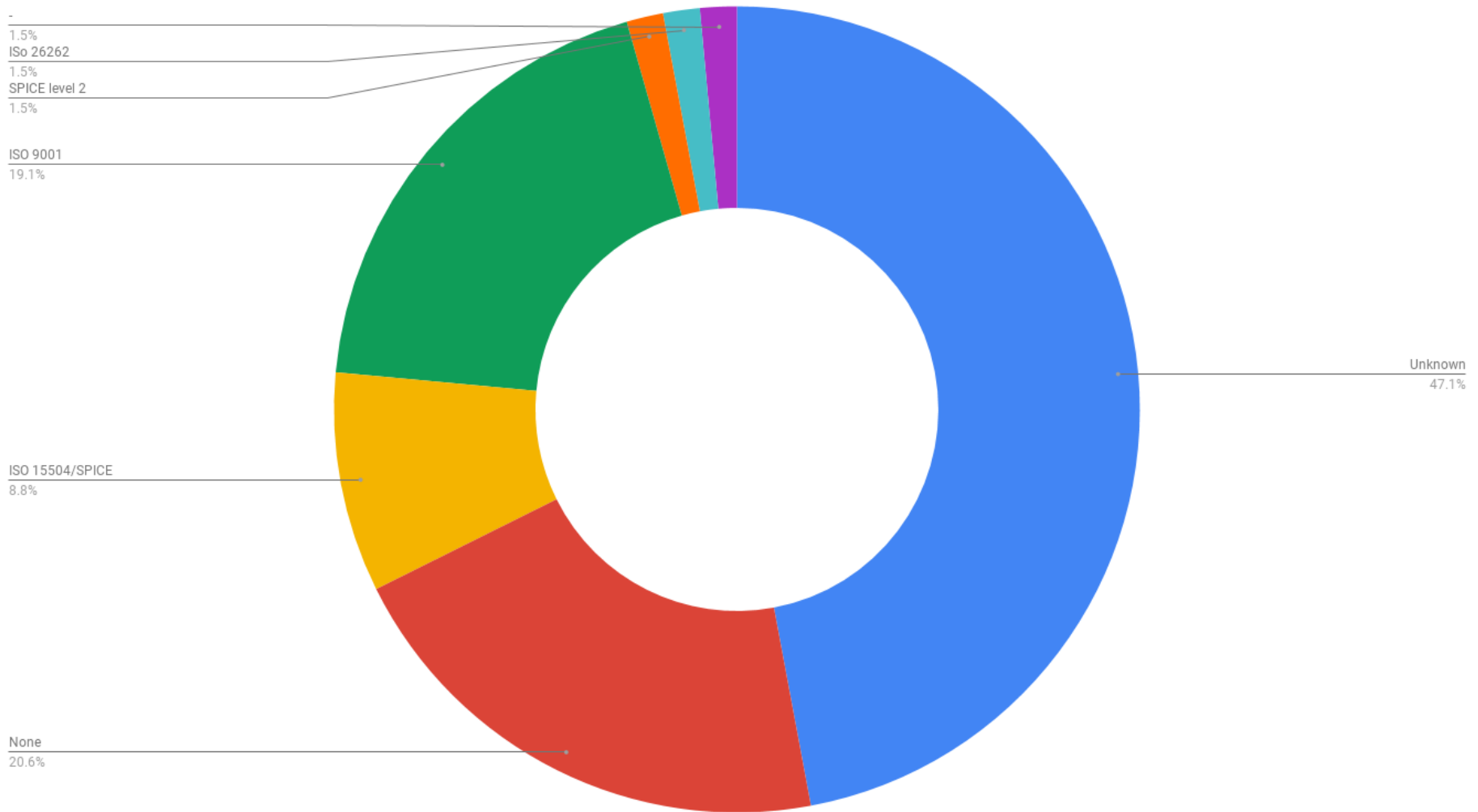
Project size

How would you estimate the size of project in the terms of line of code?



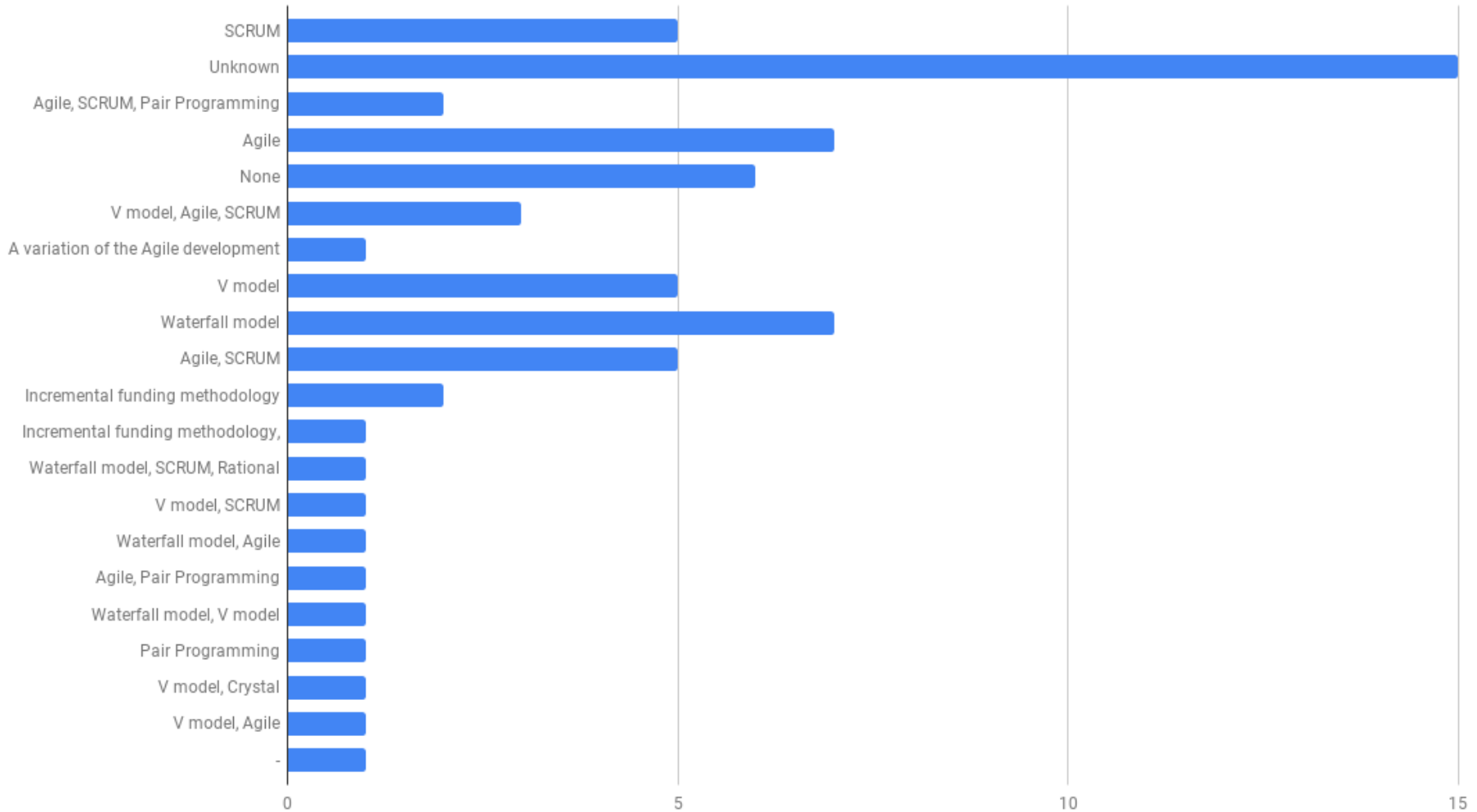
Software quality model

Which of the following Software Quality Management approaches best describes the one you are using/did use in the project?



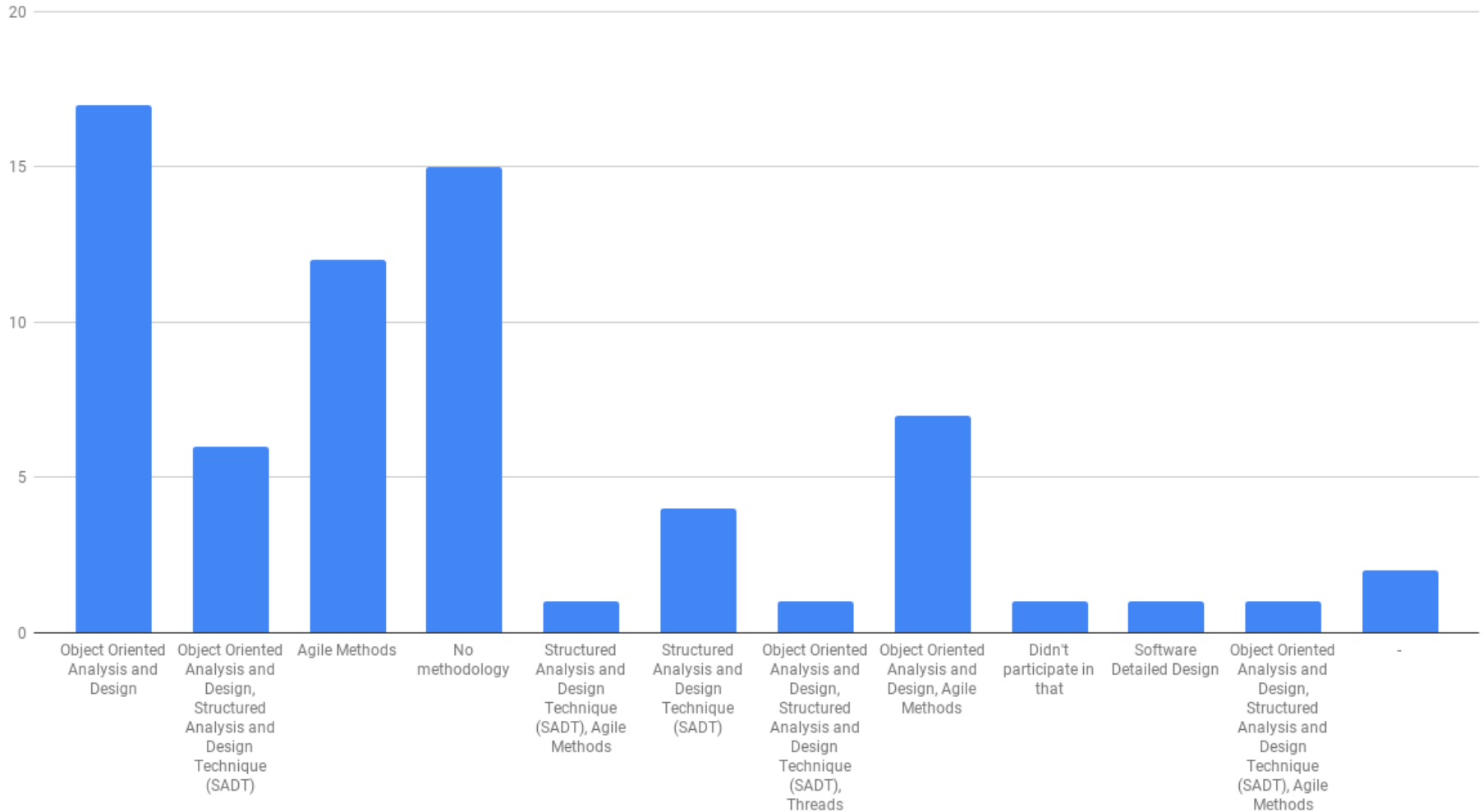
Development lifecycle

Which of the following development life-cycles best describes the one you are using/did use in your project?



Analysis and design approaches

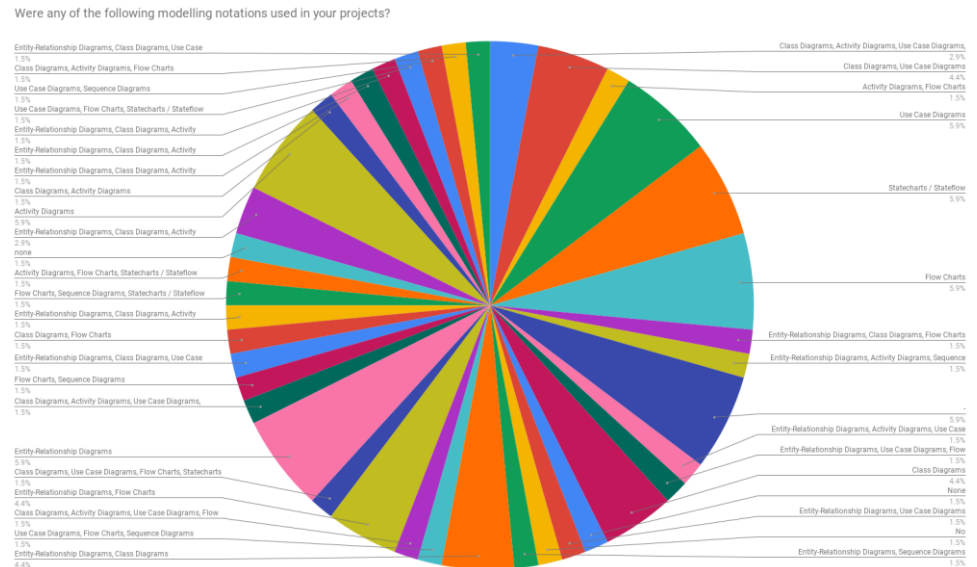
Which of the following approaches are you using/did use in analysis and design phase?



Modeling notations

- Were any of the following modeling notations used in your projects?

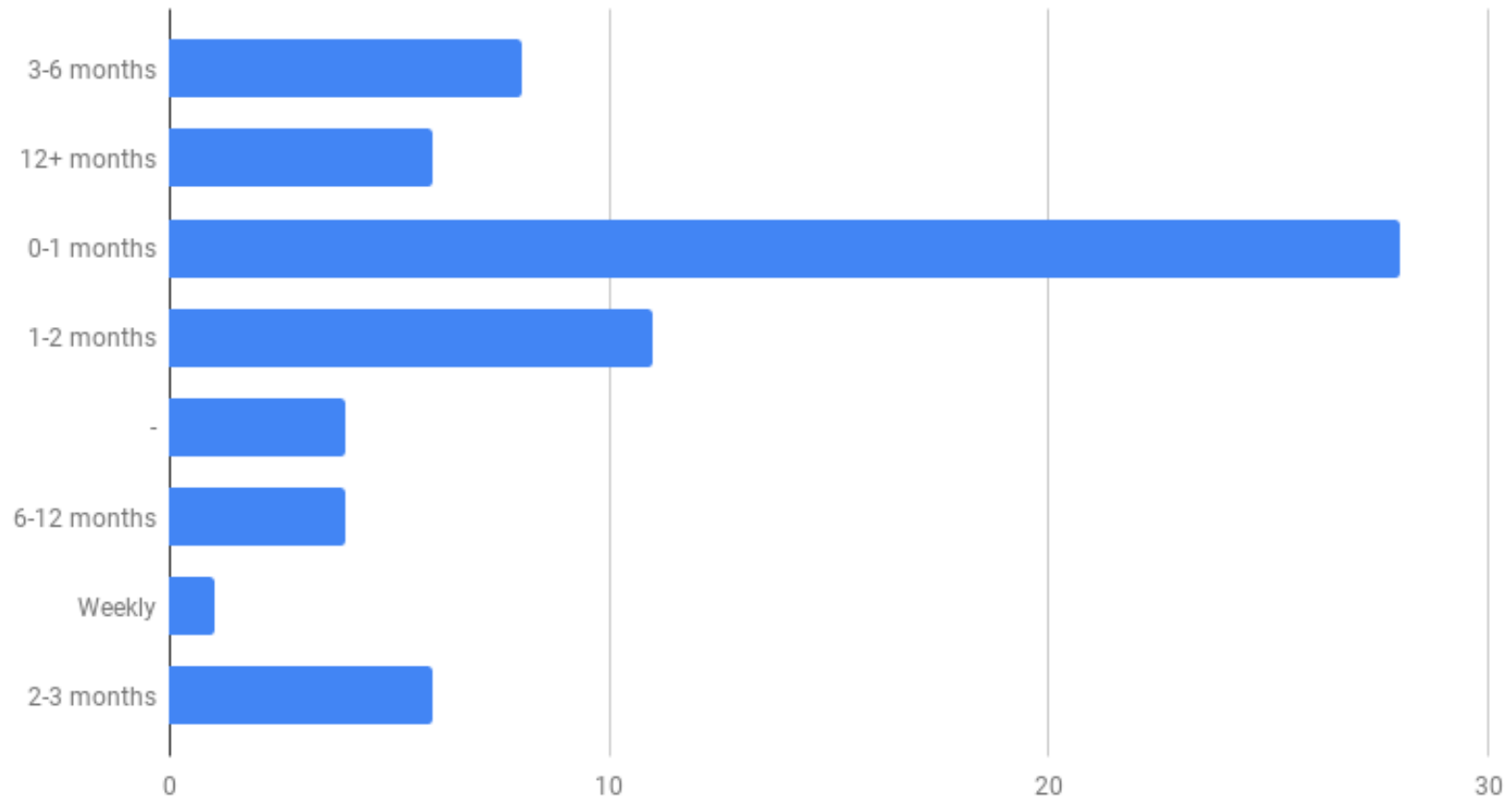
- ❑ Entity-Relationship Diagrams
- ❑ Class Diagrams
- ❑ Activity Diagrams
- ❑ Use Case Diagrams
- ❑ Flow Charts
- ❑ Sequence Diagrams
- ❑ Statecharts / Stateflow
- ❑ Other...



- **Resulted pie chart is too fragmented**

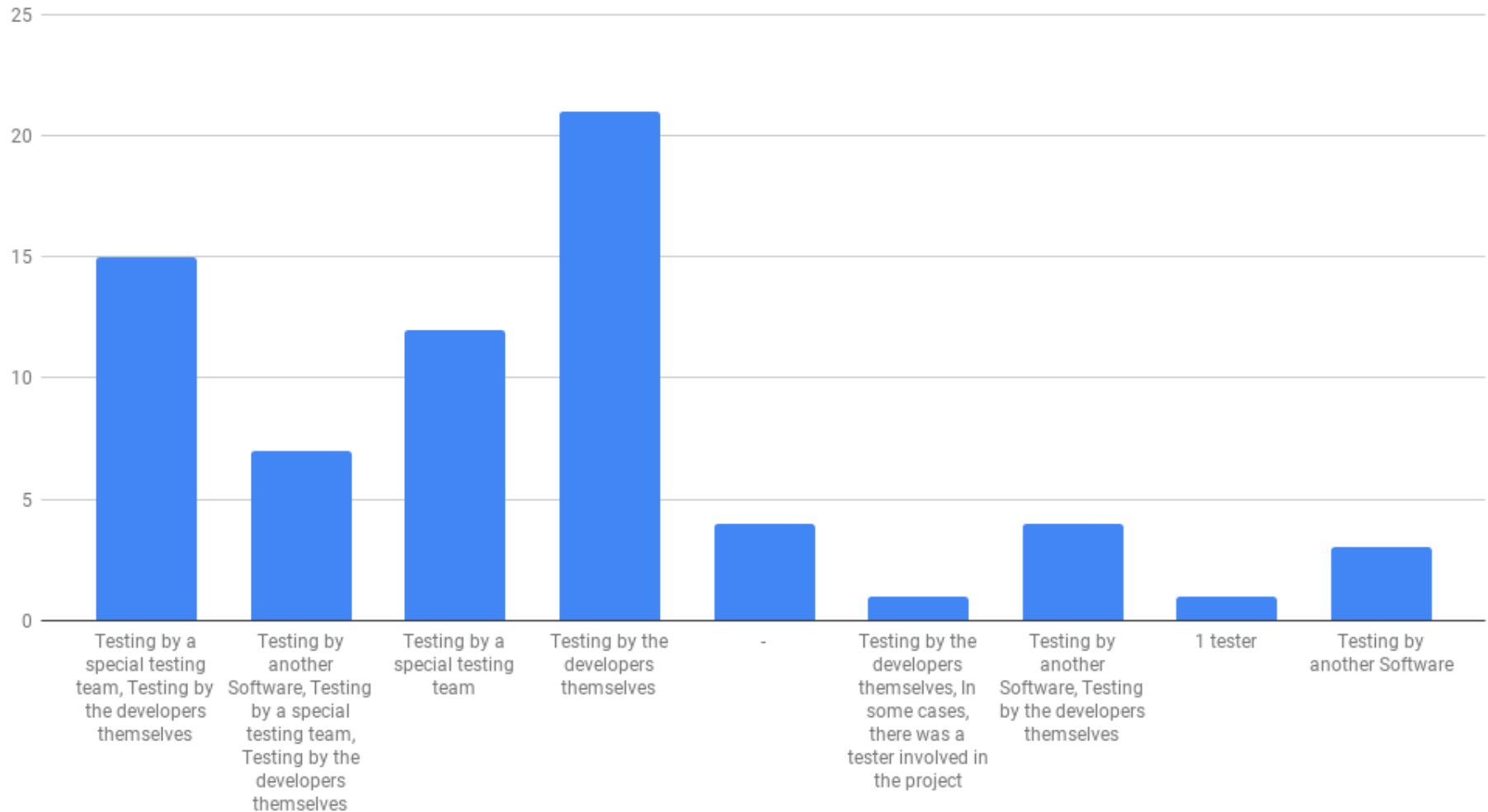
Release period

How often was a new version released (of the software built in your project)?



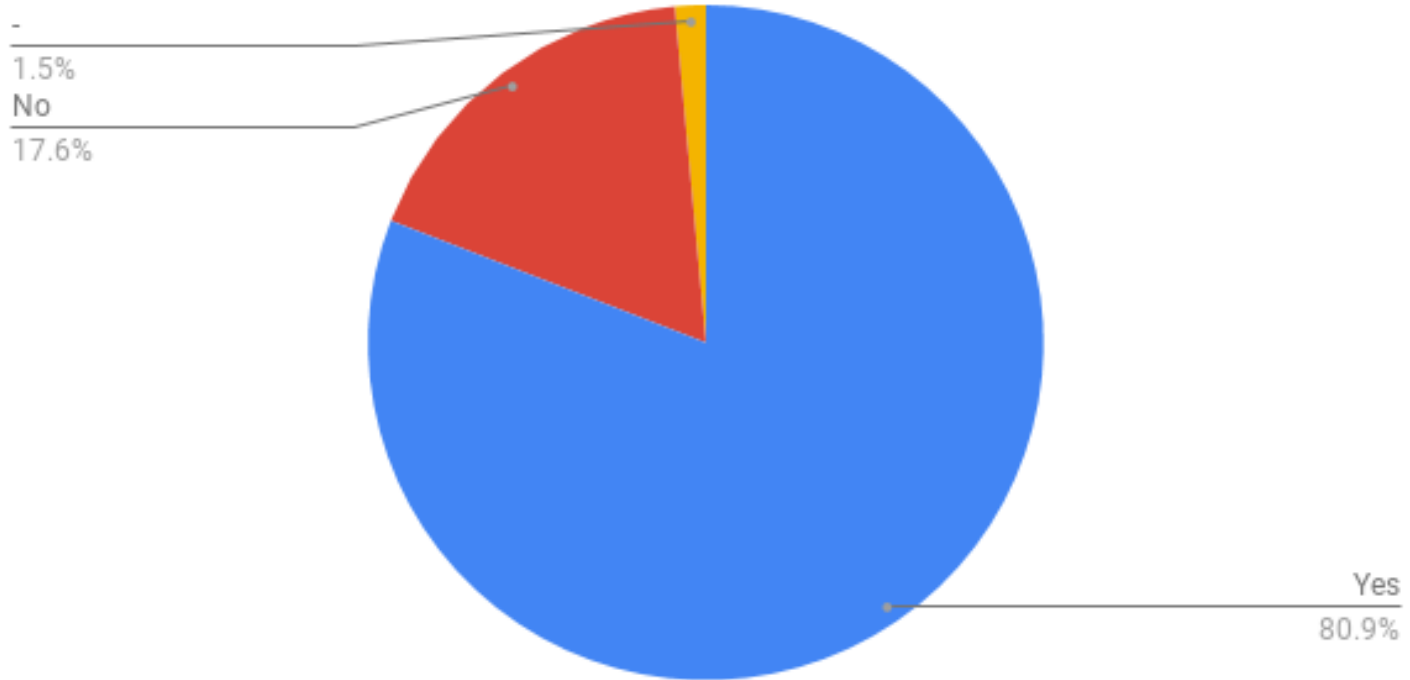
Testing mechanism

Which of the following testing ways were applied to your software?



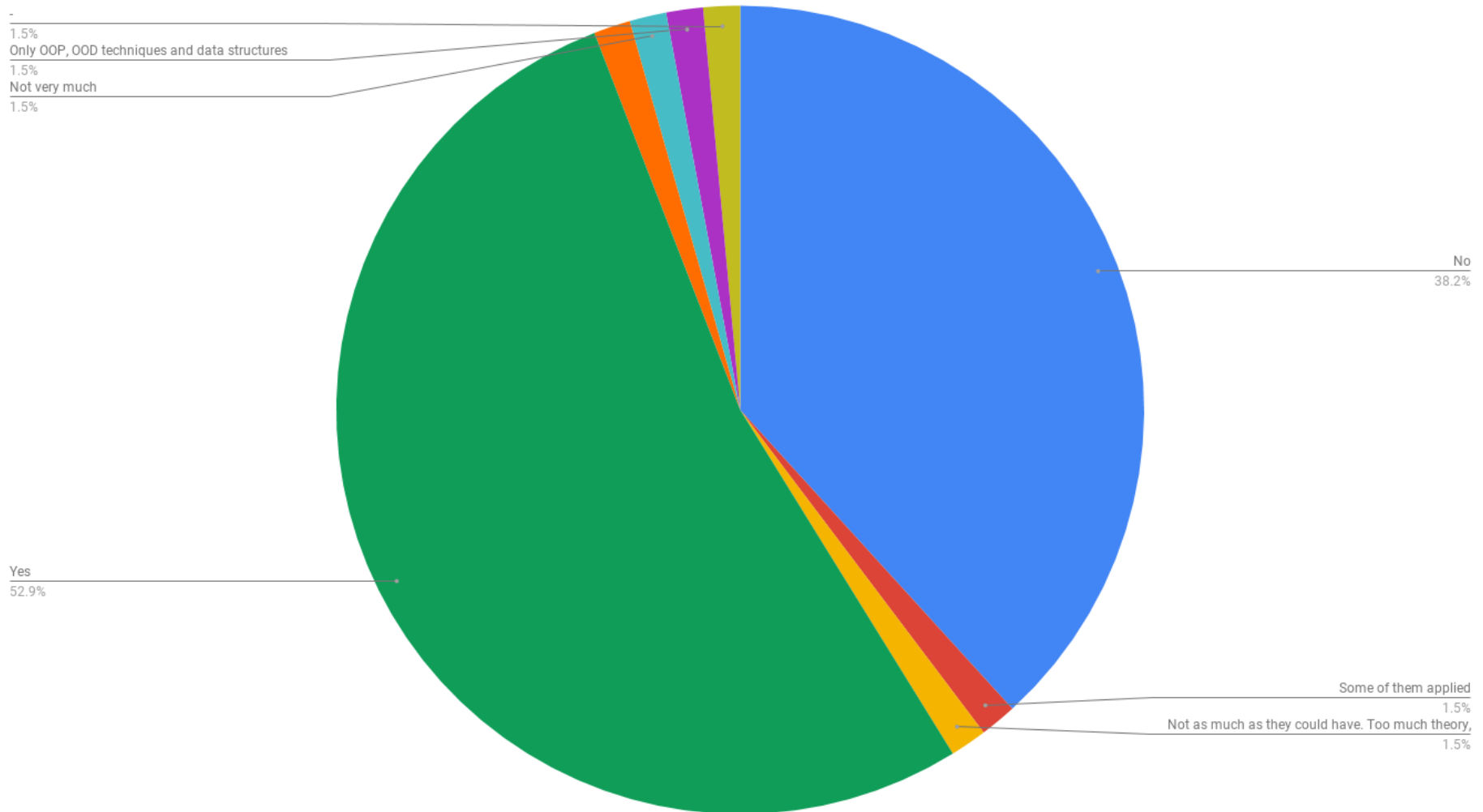
Better understanding of academic subjects

Did/Does this project help you in better understanding of subjects taught at school?



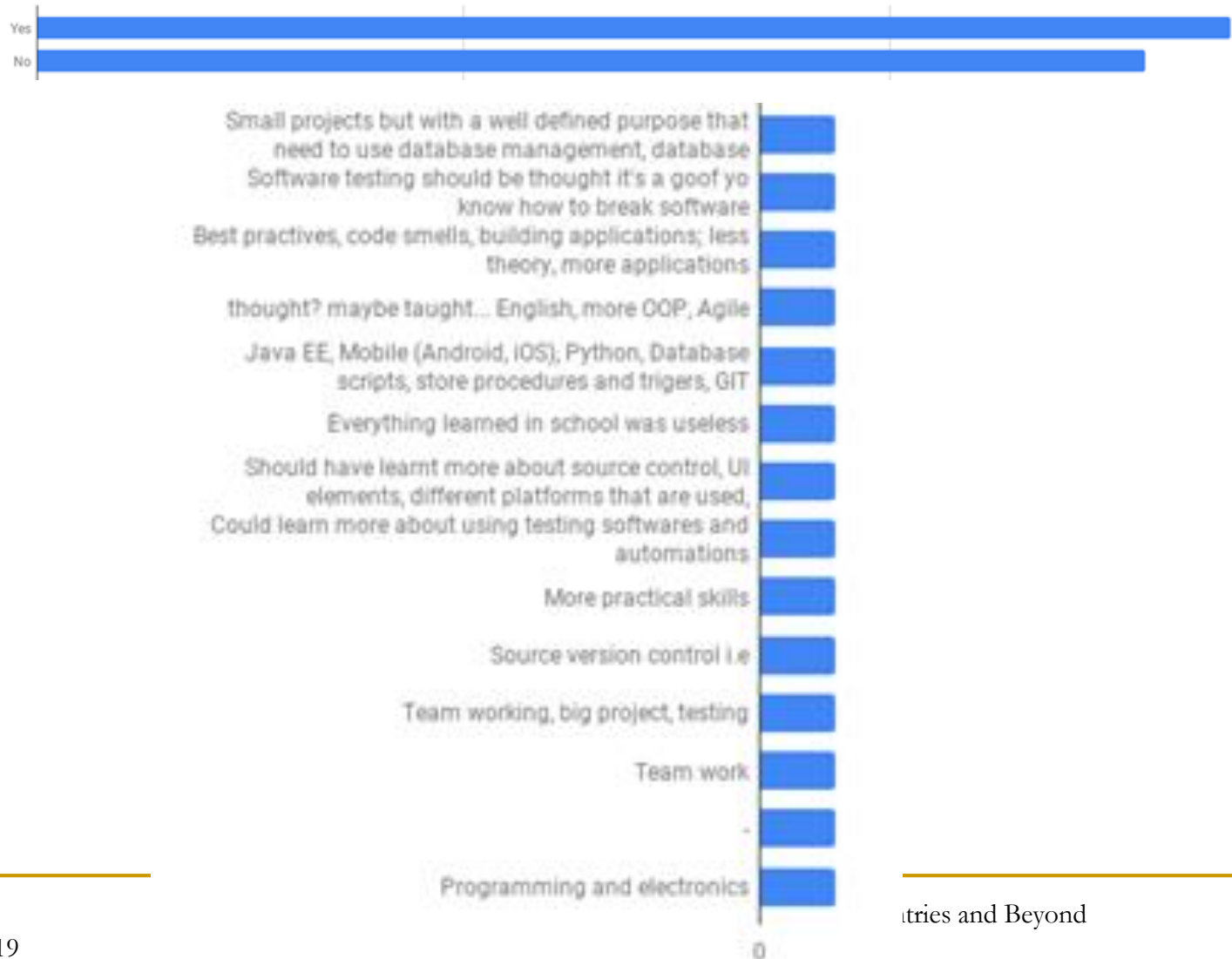
Did academic subjects helped in projects

Do the subjects learnt at school helped you in developing the projects you were involved in so far at different companies?



Other useful skills

Are there skills learned during developing projects that you think should have been taught at school or in a different way? If yes, what?



Career guidance at school

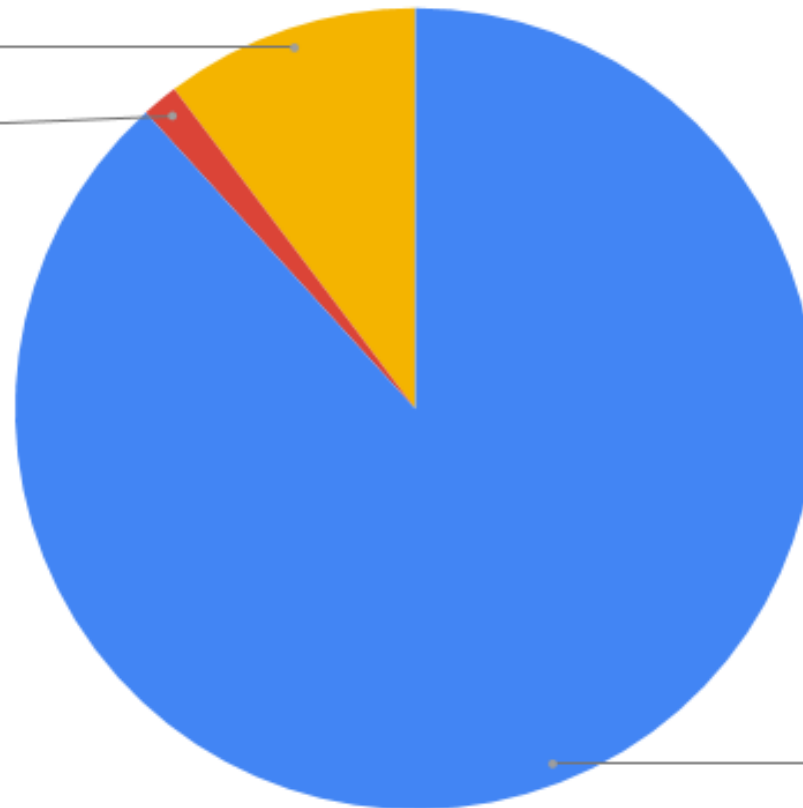
Would you have expected more career guidance at school?

No

10.3%

I think some advises and

1.5%



Yes

88.2%

Competencies for company

- OOP, logical thinking, basic algorithms.
- English language mandatory, basic knowledge of C# / Java, design patterns
- Java EE, JSP, JSF2, Database skills, beginner skills in Linux commands, basic skills of networking
- Full stack Javascript knowledge and little mobile programming knowledge
- Web-programming and in the field of networking
- Programming language, electronics, embedded systems
- C knowledge, microcontrollers, CAN communication
- Level of Decision-Making, Responsibilities and Authorities
- Attention to details
- C, English, logical thinking
- Team work, task management

Skills would have helped being learned in the school?

- **Basic troubleshooting and investigation skills (debugging, profiling, etc.)**
- Internships, research projects to gain further experience about real-life projects
- Teamwork experience
- Business and / or domain knowledge in different areas (in addition to IT/Computer Science knowledge)

Discussion



- From 43 posed questions, we appreciated that only 36 questions had clear results.
- Unclear results were caused by:
 - ❑ **Vaguely** formulated questions
 - ❑ **Not relevant** questions / participant knowledge outside the scope of the question
- Examples of vagueness:
 - ❑ The students do not perceive the short-, medium-, and long-term company goals
 - ❑ Students are not involved in project management
 - ❑ Many students have software engineer or QA engineer role, but they do not know the correct name of their position

Conclusions



- Students worked in small, medium and large projects.
- Most of the time they worked in small teams of 3-6 members.
- Project duration was in almost half of situations of at most 6 months.

Conclusions



- Most students want more career guidance and implicitly more teamwork training, on real-life projects.
- Most students want to practice acquired knowledge on real-life projects, by observing the practical applicability of their knowledge
- There is a correlation between knowledge acquired in school with knowledge mastered in companies, although many students do not immediately observe the applicability into practice of academic knowledge. Working in a company helps to bridge this gap.

