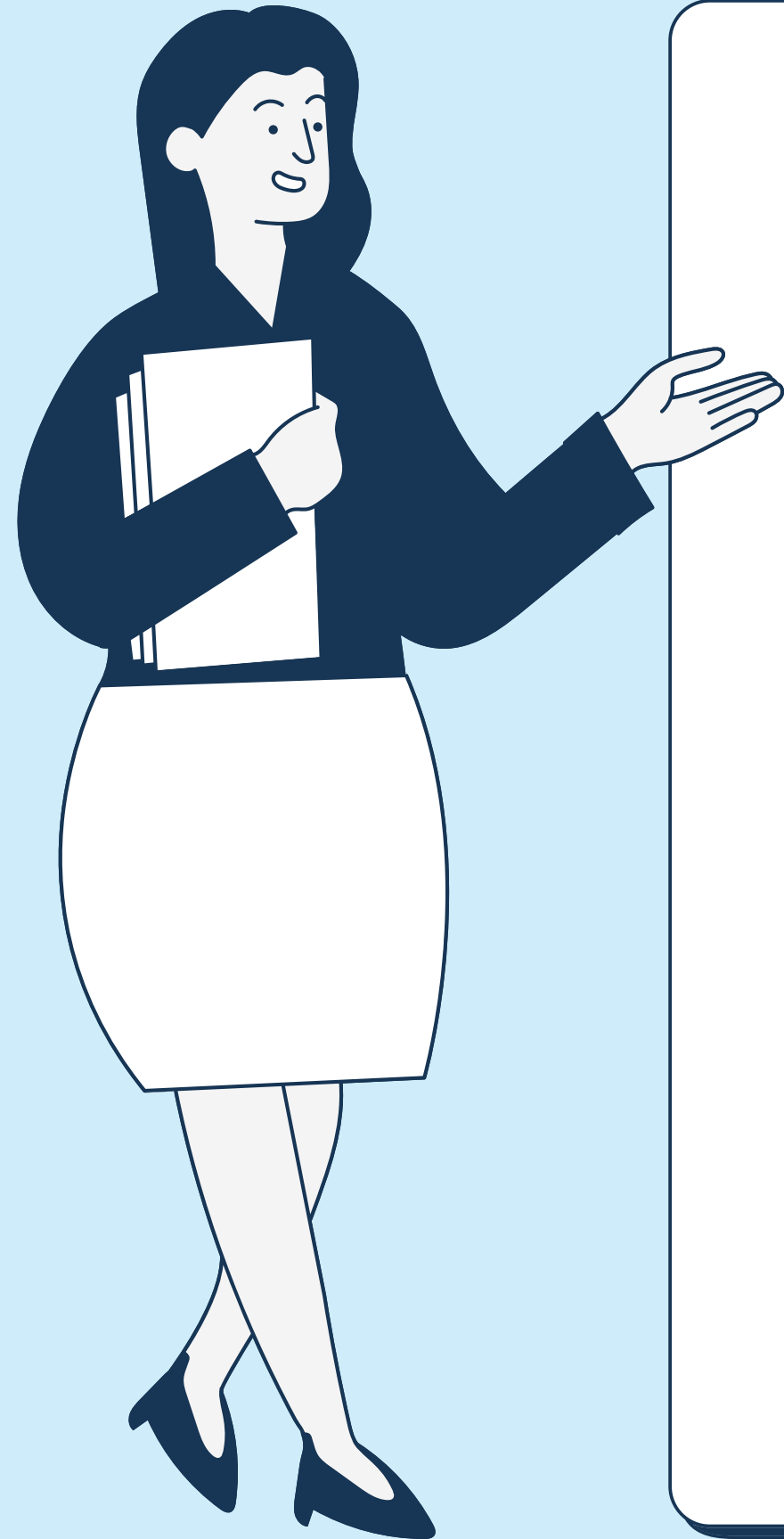Frederic Setievi - Jessica Natalia - Theodore Raynard Tjhang

OneEd

Software Engineering 2022

What is OneEd?

OneEd is a more enhanced application to facilitate online courses for students and teachers, to help students find webinars, competitions, and scholarships in just one application.

Why OneEd?

One integrated application

....

Reducing the need to change between applications and preserve more memory.

Interactive application

....

Able to chat with tutor to ask confusing materials.

All in one app solution

....

Find webinars, competitions, and scholarships in just one application.

Methodology:

Waterfall Method

The waterfall model is a sequential model that consists of 5 basic phases

Communication - Planning - Modeling - Construction - Deployment

Several advantages that this model offers are that it is fairly easy to understand and use, the phases are well defined and in order, and it has a clear time boxing

Communication

During this phase, we initiated the project, analyzed the problem, gathered the requirements, and also defined the features and functions in the application so the team knows exactly what exactly needs to be done. The requirements can be gathered in journals, articles, and the internet.

Apakah dengan banyaknya aplikasi penunjang pembelajaran yang ada, kalian merasa kesulitan dalam mengintegrasikan semua aplikasi yang ada?

48 responses

- Ya, kurang praktis karena harus berganti-berganti aplikasi.
- Tidak, biasa saja.

22.9%

77.1%
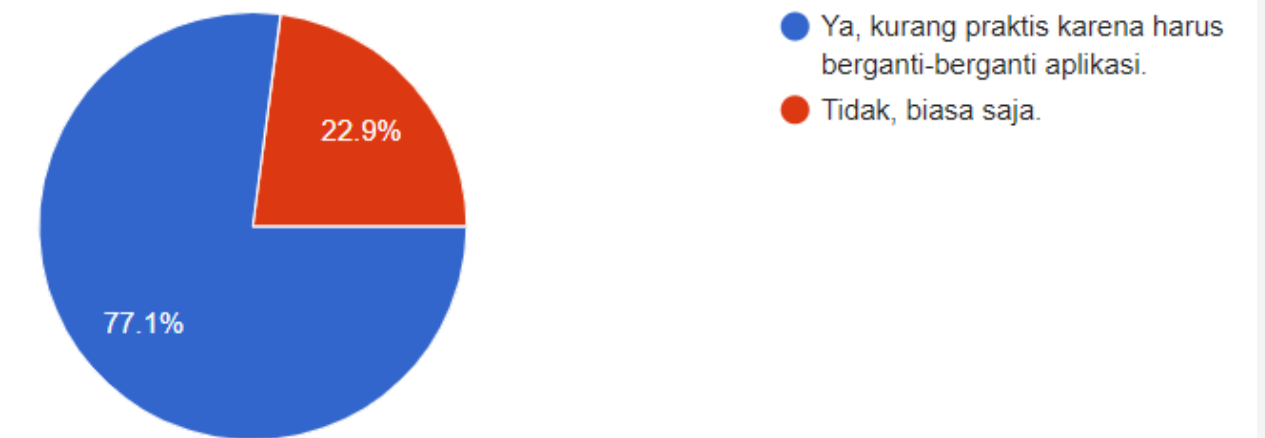
Apakah dengan banyaknya aplikasi yang dibutuhkan, sangat memakan ruang penyimpanan memori perangkat anda?

48 responses

- Ya, sangat memakan ruang penyimpanan memori
- Tidak, biasa saja

29.2%

70.8%
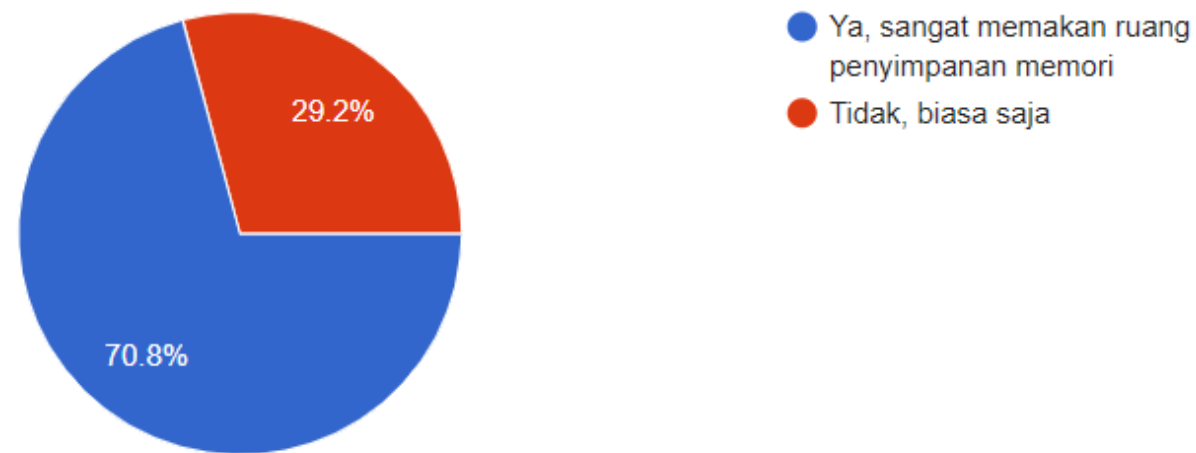
Apakah anda merasa terbantu jika terdapat aplikasi yang dapat mengumpulkan berbagai kebutuhan pelajar (belajar, tutoring, mencari informasi lomba, magang, dan webinar) dalam satu aplikasi saja?

48 responses

- Ya, sangat terbantu
- Tidak, biasa saja

100%

Planning

Explains the estimation of the technical tasks to be carried out, the risks that can occur, the resources needed to create the system, the work products to be produced, the scheduling of work to be carried out, and tracking of the system work process.

TABLE I. PROJECT TIMELINE TABLE

Process	Duration	Date
Communication	2 weeks	25 October 2021 - 14 November 2021
Planning	2 weeks	15 November 2021 - 28 November 2021
Modeling	1 month	29 November 2021 - 26 December 2021
Construction	1 month, 2 week	27 December 2021 - 6 Februari 2022
Deployment	3 weeks	7 February 2022 - 21 February 2022

Modeling

Concerned with the analysis and design of data structures, software architectures, interface displays, and program algorithms that suit the requirements when it is implemented in developing the application
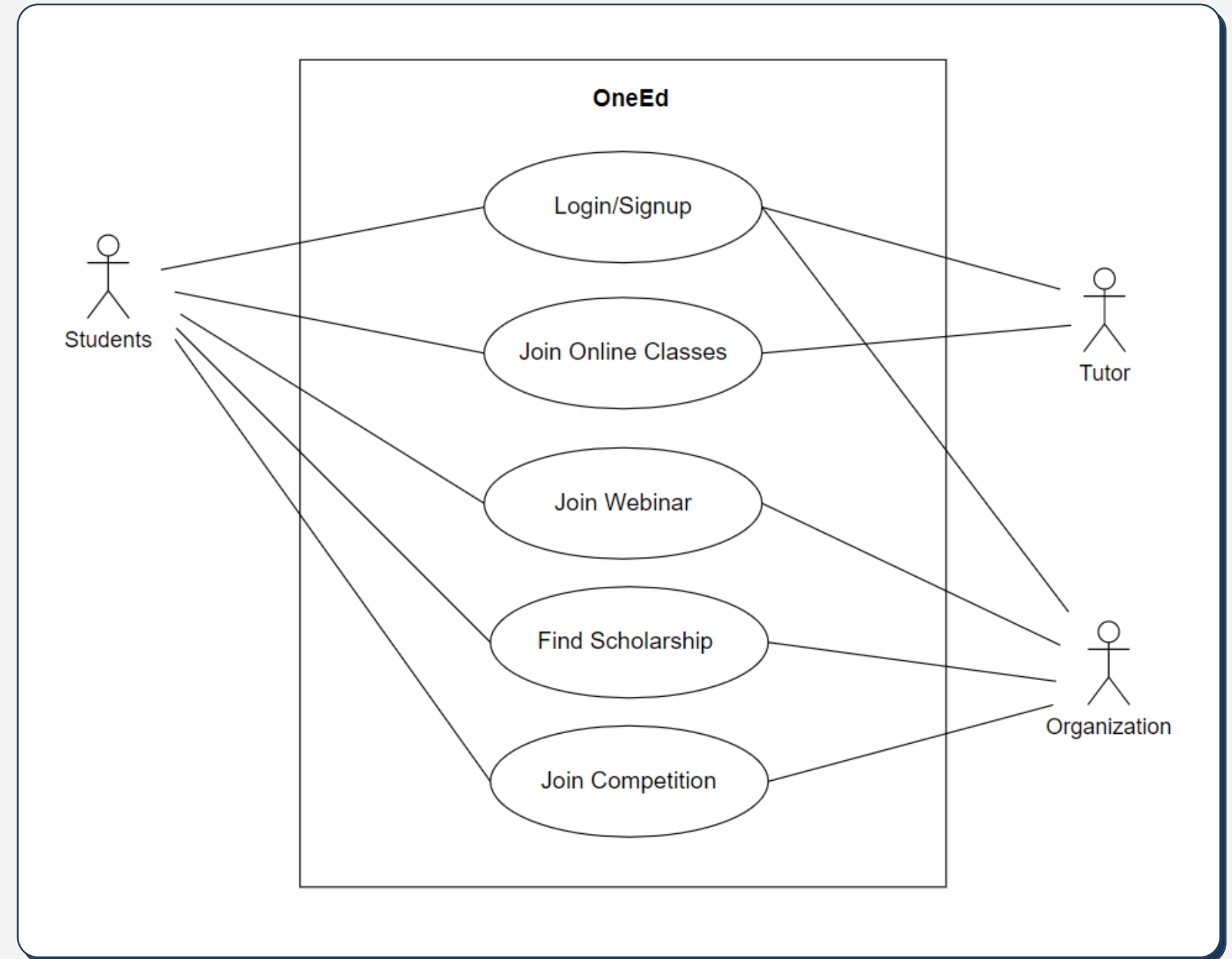
Construction
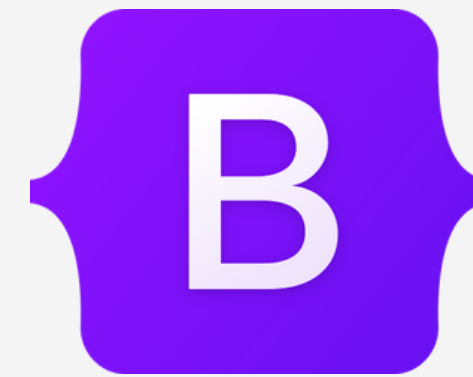
Deployment

Result

- Function Point
- Kilo Lines Of Code (KLOC) Metrics
- The Constructive Cost Model (COCOMO)
- McCall's Triangle of Quality

Function Point

User Input	24	weight = complex
User Output	20	weight = simple
User Inquiries	18	weight = simple
User Files	7	weight = complex
External Interface	5	weight = complex

Value Adjustment Factor

1. Data Communications = 5
2. Distributed Data Processing = 0
3. Performance = 5
4. Heavily Used Configuration = 4
5. Transaction Rate = 4
6. Online Data Entry = 5
7. End-user Efficiency = 5
8. Online Update = 4
9. Complex Processing = 3
10. Reusability = 5
11. Installation Ease = 4
12. Operational Ease = 4
13. Multiple Sites = 1
14. Facilitate Change = 4

Total = 53

Function Point

TABLE II. FUNCTION POINT

Domain	Value	Weighting Factors			
		Simple	Average	Complex	
EI	24	3	4	6	144
EO	20	4	5	7	80
EQ	18	3	4	6	54
ILF	7	7	10	15	105
EIF	5	5	7	10	50
Count Total (UFP)					433

$Complexity\ Adjustment\ Factor = 0{,}65 + 0{,}01 * \Sigma(Fi)$

$= 0{,}65 + 0{,}01 * 53$

$= 0{,}65 + 0{,}53$

Complexity Adjustment Factor = 1,18

$Function\ Point = Unadjusted\ Function\ Point * Complexity\ Adjustment\ Factor$

$= 433 * 1{,}18$

Function Point = 510,94

Kilo Lines Of Code (KLOC)

B. *Kilo Lines Of Code (KLOC)* Metrics

The effort is the main cost driver for software development. The primary element that affects the effort estimation is the developed kilo line of code (KLOC) which includes the program instructions and statements [19].

Javascript = 47 average lines of code

HTML = 34 average lines of code

Average = 40.5 lines of code

KLOC = FP * average lines of code per function point

KLOC = 510,94 * 40.5 = 20.693,07 ≈ 21 KLOC

COCOMO

$$Effort = a(KLOC)^b * EAF$$

$$Time = c(Effort)^d$$

$$Person = Effort / Time$$

KLOC = Kilo Lines Of Code

TABLE III. COCOMO CONSTANTS

Software Projects	a	b	c	d
Organic	0.75	1.05	2.5	0.38
Semi-detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

TABLE IV. EFFORT ADJUSTMENT FACTOR WEIGHT

Cost Drivers	Nominal				
	Very Low	Low	;	High	Very High
Product Attributes					
Required Software Reliability	0.75	0.88	1.00	**1.15**	1.40
Size of Application Database		0.94	1.00	**1.08**	1.16
Complexity of the Product	0.70	0.85	1.00	**1.15**	1.30
Hardware Attributes					
Runtime Performance Constraints			1.00	**1.11**	1.30
Memory Constraints			1.00	**1.06**	1.21
Volatility of the Virtual Machine Environment		0.87	**1.00**	1.15	1.30
Required Turnabout Time			0.94	**1.00**	1.07	1.15
Personal Attributes					
Analyst Capability	1.46	**1.19**	1.00	0.86	0.71
Applications Experience	1.29	**1.13**	1.00	0.91	0.82
Software Engineer Capability	1.42	1.17	**1.00**	0.86	0.70
Virtual Machine Experience	1.21	1.10	1.00	**0.90**	
Programming Language Experience	1.14	1.07	1.00	**0.95**	
Project Attributes					
Application of Software Engineering Methods	1.24	1.10	1.00	0.91	**0.82**
Use of Software Tools	1.24	1.10	1.00	0.91	**0.83**
Required Software Schedule	1.23	1.08	1.00	**1.04**	1.10

COCOMO

Effort Adjustment Factor

$$= 1.15 * 1.08 * 1.15 * 1.11 * 1.06 * 1.00 * 1.00 * 1.19 *$$
$$1.13 * 1.00 * 0.9 * 0.95 * 0.82 * 0.83 * 1.04$$

$$= 1.33A$$

$$Effort = 2.4(21)^{1.05} * 1.33 = 78.05 \ person/months$$

$$Time = 2.5(78.05)^{0.38} = 13.09 \ months$$

$$Person = 78.05/13.09 = 5.96 = 6 \ person$$

McCall's Triangle of Quality
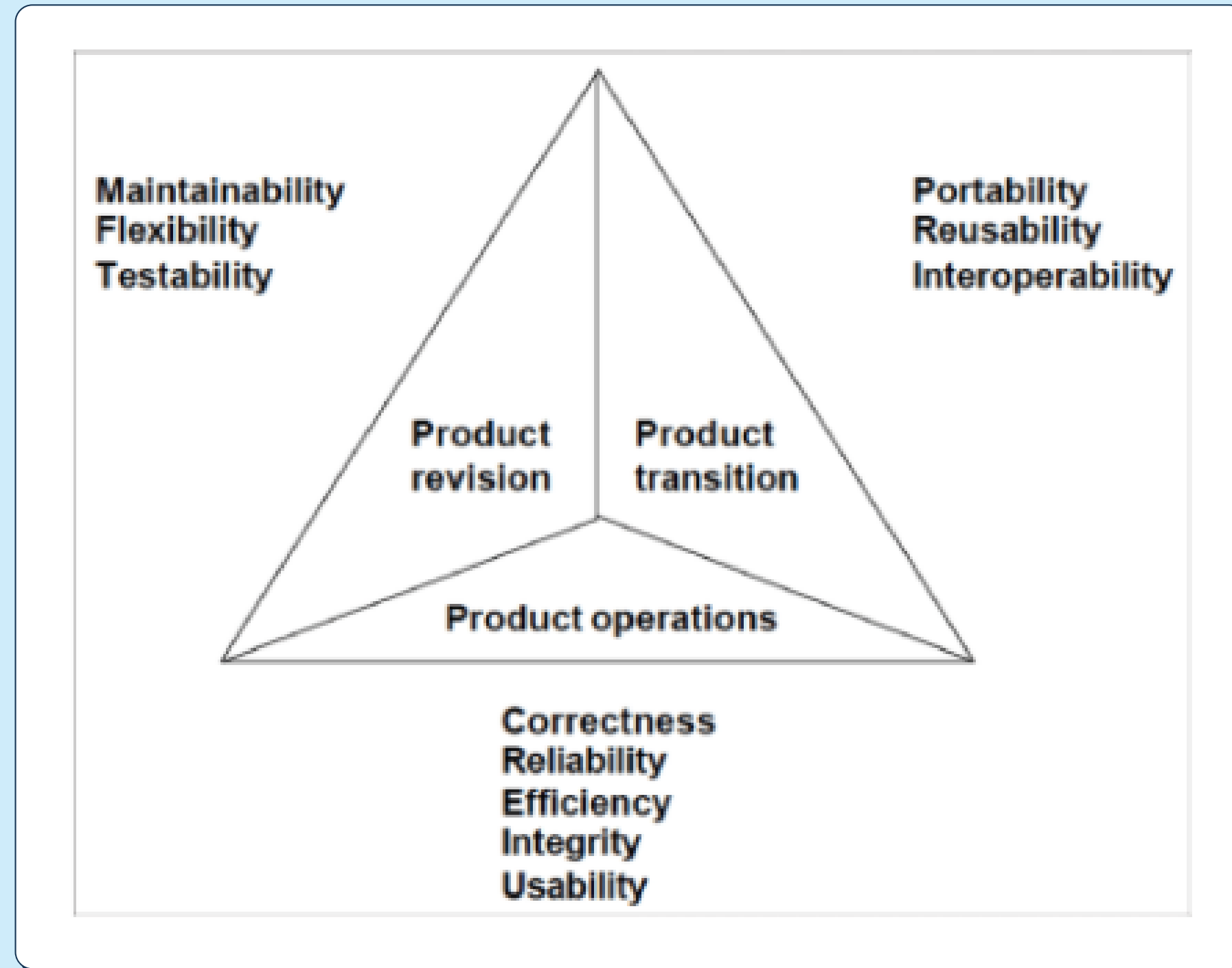
Product Revision

Maintainability

There is a maintenance schedule every two weeks to prevent future system damage. If there is a system failure, we will replace it immediately.

Flexibility

Users can change the configuration (language, password, interface size, and more) according to their desire.

Testability

Application testing is carried out on functional and non-functional requirements. We can conclude that the application has fulfilled this aspect.

Product Transition

Portability

The application server is recommended to run limited on the Windows operating system.

Reusability

The application has a chat and live video meeting features using an already available API. This API can also be used in other web applications, so it can be considered reusable.

Interoperability

The creation of an interface with a web-based system so that it can be accessed smoothly through all operating systems and all types of devices.

Product Operation

Correctness

So far, the application has been tested using test cases and gives good results; the implementation of the application is under the requirements that have been mentioned.

Usability

The application's usability has been well tested, according to the non-functional requirements mentioned above.

Efficiency

The programming language used to build this application uses HTML, CSS, and Laravel, which is suitable for this kind of web-based application.

Product Operation

Reliability

The application has been tested with SQL injection, and the system's security is maintained.

Integrity

So far, Integrity is tested from account security with all levels of users. A test case proves the account security test, and it works.

Conclusion

Nowadays, there are many standalone applications for students to study or to search for information for webinars, scholarships, and competitions. Therefore, we develop OneEd application that integrates courses, webinars, competitions, and scholarships in a single platform. Moreover, the course will have live meetings that help students to understand better about the subject. OneEd's goal is to make studying, joining webinars, competitions, and scholarships as effective as possible for students.

OneEd is developed according to the software engineering principle, more precisely the waterfall model. Starting from communicating the requirements, planning the project, building the models, constructing the application, and lastly deploying to the local host.

The results from analyzing students' requirements, the OneEd application has fulfilled their needs in having just one app that facilitates all features that helps them to study.

Thank You