Tuijin Jishu/Journal of Propulsion Technology
ISSN: 1001-4055
Vol. 45 No. 1 (2024)

The Implementation of Extreme Programming in the Web-Based Exam Application as an English Skills Mapping

***[1]Hendra Jatnika, [2]Yudhi Setyo Purwanto, [3]Dewi Arianti Wulandari**
[1,2,3]Institut Teknologi PLN; Menara PLN, Jl. Lingkar Luar Barat, Duri Kosambi, Cengkareng, Jakarta Barat, DKI Jakarta, 11750, Ph. (021) 5440342
Informatics Engineering, Faculty of Telematics Energy, ITPLN, Jakarta

Abstract

Based on the need to master English language skills to increase the competitiveness and marketability of college graduates, all students are required to take part in an English language program called Basic English Language Learning (BELL). This program begins with an English test called the Integrated Standard English Exam (I-SEE). This test aims to determine the mapping of participants' skills so that learning can only focus on strengthening participants' weaknesses. This research discusses the design of a web-based I-SEE exam application. The test results are presented in table form for each assessment aspect category. The results of the recapitulation will be used as a basis for determining the next Learning Plan (LP) used by tutors and students so that they can focus only on students' weaknesses, and the subsequent learning process can be carried out in more detail and comprehensively. This application was built using an application development method using Extreme Programming (XP), CodeIgniter framework with PHP programming language and MySQL database. The result of this research is a design for the I-SEE English exam application for college level participants.

Keywords: design, integrated Standard English Exam, web, codeigniter, php

INTRODUCTION

Singapore is still listed as the only country in Southeast Asia with the best ranking on the English Proficiency Index (EPI) conducted by English First (EF) in 2023 (First, 2023). Singapore is ranked 2nd out of 113 countries surveyed, above European and South American countries. Meanwhile, Indonesia is ranked 79th in the world and 5th in Southeast Asia with a low proficiency index.

Table 1. EF EPI 2023 for Southeast Asia Region

No	Country	Score	Rank	Proficiency
1	Singapore	631	2	Very High
2	Philipines	578	20	High
3	Malaysia	574	25	High
4	Vietnam	505	58	Moderate
5	Indonesia	473	79	Low
6	Myanmar	450	90	Low
7	Cambodia	421	98	Very Low
8	Thailand	416	101	Very Low
9	Laos	n/a	n/a	n/a
10	Brunei	n/a	n/a	n/a
11	Timor-Leste	n/a	n/a	n/a

*EF EPI: English First English Proficiency Index

https://www.ef.com/wwen/epi/

This matter becomes a concern because Indonesia, which is Singapore's closest neighbour, is not able to match its people's English language skills. English is important because apart from being an international language, it is also used in various aspects of life, from economics, business, health, education, to fields related to leisure and pleasure globally (Hapsari, 2019)(Muttaqin & Chuang, 2022). In global competition, the ability to speak English will be one of the main weapons that will provide greater opportunities to win various forms of competition and competition in life, so it is an absolute must for every Indonesian citizen, especially for the productive generation.

In fact, even though English has been taught since elementary education level, the ability of Indonesian people to master this language is still relatively low (Sakkir et al., 2021). The campus is a means of forming and creating a young generation that is ready to work, ready to compete and ready to be the spearhead in improving English language skills. On campus, through various policies and developing cultures, students are expected to play an active and dynamic role in learning and mastering these language skills (Siew Eng & Jiaxi, 2022)(Shijun, 2022).

A campus in West Jakarta takes this seriously by creating programs to improve English language skills both intra-curricular through classroom learning according to the curriculum and extra-curricular through the formation of organized and structured study groups. This is also supported by the Basic English Language Learning (BELL) program which focuses the learning processes on improving the language weaknesses of each student. Mapping of student abilities is conducted using an exam system called the Integrated Standard English Exam (I-SEE) which can provide exam results per category (language subject).

In I-SEE, there are five types of material evaluated, i.e.: listening, reading, structure and grammar, social skills, and picture/audio. Each material will contain ten questions, bringing the total to fifty questions. The test results are presented in table form for each assessment aspect category. The results of the recapitulation will be used as a basis for determining the next Learning Plan (LP) which will be used by tutors and students so that they can focus only on subjects that are students' weaknesses, and the subsequent learning process can be conducted in more detail and comprehensively.

Online testing provides many advantages for test administrators (Alrefaai, 2016)(Ayuba & Masae, 2022). Efficiency can be achieved in various aspects of activities, from preparation, implementation, to reporting. This includes the areas of human resources, use of stationery, costs for duplicating questions and answer sheets, and other elements needed to carry out a test activity. The amount of working time can also be reduced a lot due to the automation of the exam system so that work effectiveness can increase. This type of test also allows staff and lecturers to conduct tests with aspects that cannot be accommodated by paper-based tests, such as automatic randomization of questions, audio-image questions, and video-based questions. The variety of question package variants can also be increased because human resources can be diverted to this task.

The main idea of this research is to utilize standard English proficiency tests as a basic platform for mapping prospective students' English abilities. The test results/scores will be broken down by category (score breakdown) so that it can be seen in which category the student has strengths and weaknesses. The data is then processed by the application to be used as material for making Learning Plans, especially for students who do not meet the English proficiency standards.

RESEARCH METHOD

This research begins with determining the type of test that will be tested. Focus Group Discussion (FGD) is the method chosen as a means of determining the type of test, test standard, test category, number, points/scores, level of difficulty per question, and passing standards. This method was chosen because it can accommodate various input and suggestions so that discussions occur which lead to a better system (William, 2012)(Mishra, 2016).

After conducting an FGD with 6 lecturers who teach English courses from several study programs on campus, the choice was made on the Ordinary Multiple-Choice test because it was deemed to fulfil 4 test quality criteria, i.e.: 1) validity, 2) reliability, 3) distinguishing power, and 4) balance of difficulty level (Hanifah, 2014). The standard test used is the Common European Framework of Reference (CEFR) with a score of lower middle (A2) – Elementary, considering the low level of English language skills of the Indonesian people (EF EPI, 2022).

Furthermore, it was agreed that there were five categories of question material to be evaluated, namely: listening, reading, grammar/structure, social skills understanding, and picture/audio perception at the beginner level. There are ten questions/questions in each category with a division of three difficult questions (hard), four medium questions (standard), and three easy questions (easy), so the total is fifty questions, and each level of difficulty of the questions has a different standard point. If working on questions is one minute/question, then the specified time for working on questions is approximately 60 minutes or one hour. The standard results determined are *pass* and *re-learn*.

Table 2. Test Questions Scoring Standard per Category

Level	No. of Questions	Point per Question	Sub-total
Easy	3	1,5	4,5
Standard	4	2	8
Hard	3	2,5	7,5
TOTAL	**10**		**20**

This application was built using the application development method using Extreme Programming (XP) (Romney, 2015)(Trisnadoli, 2021). XP is an agile software development or project management method that aims to produce higher quality software. XP has a short development cycle, so it is very responsive to changing user desires. XP focuses on engineering practices that are suitable for software development and are fast and simple. The Extreme Programming framework involves 5 stages of the development process, i.e., Planning, Designing, Coding, Testing, and Listening, as depicted in figure 1 below:

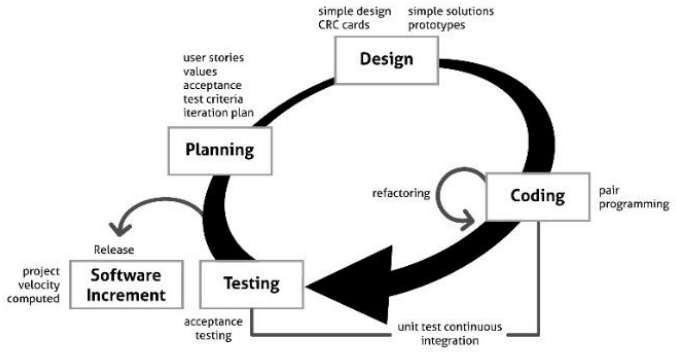

Figure 1. *Extreme Programming Method*

In practice, the team follows the XP steps which have four stages in the software development cycle, they are:

- **Planning**: At this stage, the team collects needs and data that can help in understanding the areas where this application will be used. The team also held several discussions and brainstorming with users to be able to capture application needs more comprehensively. After that, the team creates a requirements specification which is approved by the user.
- **Designing**: Simple software design is the focus in this stage. Class Responsibility Collaborator (CRC) cards are used to design applications and organize object-oriented classes that are compatible with the software being created.
- **Coding**: This stage begins by creating unit tests for each requirement that has been determined. The team uses two programmers who work together on one workstation computer to create code from one requirement (pair programming), to provide real-time problem solutions and quality assurance using codeIgniter. After that, the code is integrated with other code (continuous integration).
- **Testing**: This stage involves continuous testing to ensure that the software being developed meets user needs.

The development of the English exam application is using the CodeIgniter framework for PHP. This framework was chosen because apart from being open source and based on Model-View-Controller (MVC), it can also display a dynamic web and extensive libraries (Setiawansyah et al., 2020)(Ridwan et al., 2022). CodeIgniter can also be modified and developed according to user needs, as well as the MVC architectural design which is the industry standard for a framework.

This application uses MySQL as its database because it can organize data into one or more data tables where the data can be related to each other. MySQL works with the operating system to implement relational databases in computer storage systems, manage users, and execute SQL commands (Satoto et al., 2006)(Letwoski, 2014).

RESULTS AND DISCUSSIONS

The application design development model is created with design and implementation using use case diagrams, activity diagrams, class diagrams, and the CodeIgniter framework. The use case diagram for this application can be seen below:

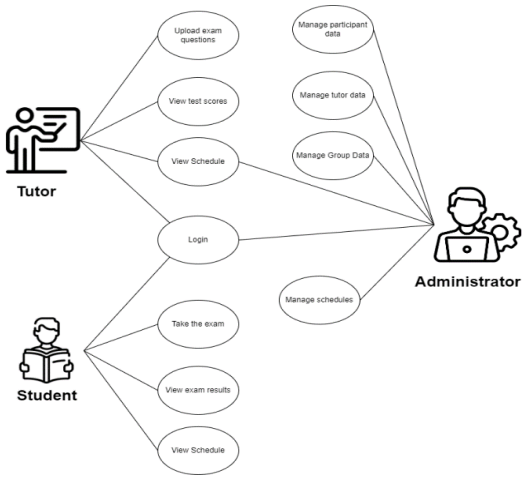

Figure 2. Use Case Diagram

In the use case diagram, there are three actors who play a role in this application, i.e., tutor, student, and administrator. Tutor actors can upload material, exam questions, and view exam scores by category and overall. Student actors can view material, take exams, and see test scores. Meanwhile, administrator actors manage materials, student, group, and tutor data, as well as material data.

Activity diagrams are made separately into three types, i.e.: for tutors, students, and administrators. The three activity diagrams can be seen below:

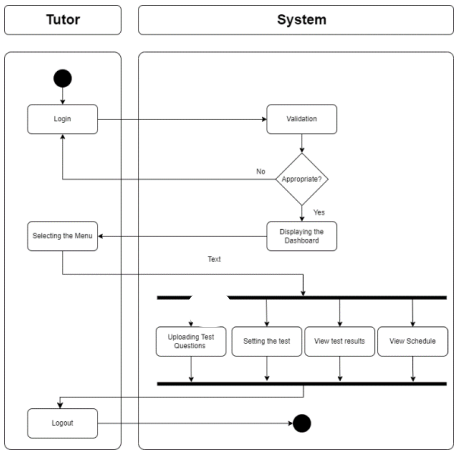

Figure 3. Activity Diagram – Tutor

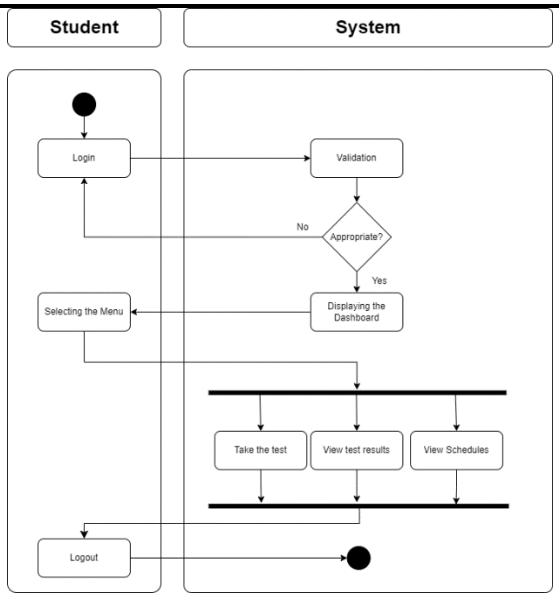

Figure 4. Activity Diagram – Student

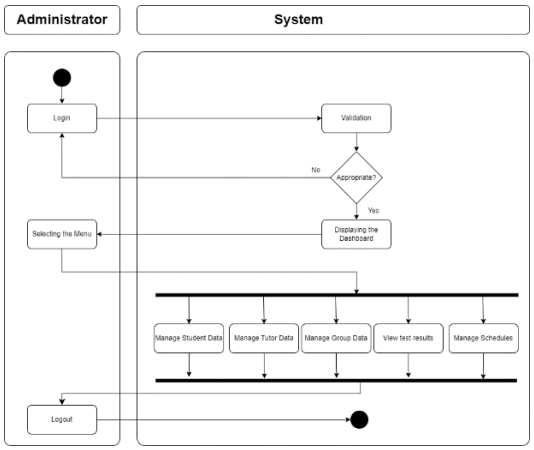

Figure 5. Activity Diagram – Administrator

Meanwhile, to be able to clarify the functions and classes of the content of this application so that it can be included in CodeIgniter, a class diagram was created, as below:

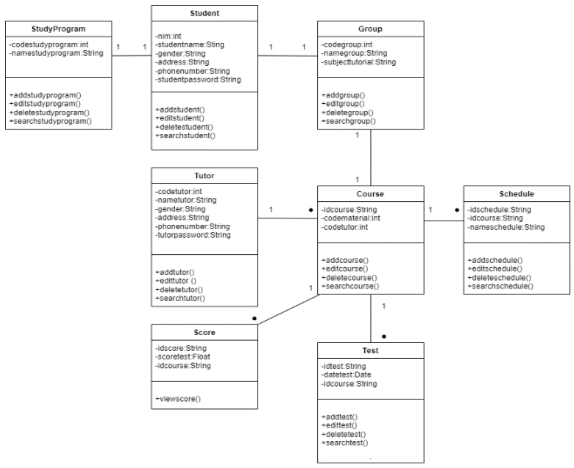

Figure 6. Class Diagram

The implementation of the I-SEE learning and exam application development system using CodeIgniter can be seen in the displays below:

App. Display

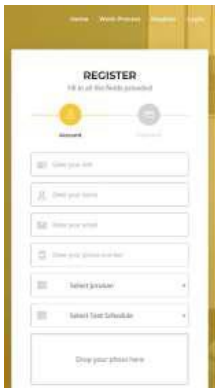

Figure 7. Register page 1

Figure 8. Register page 2

Figure 9. Login page

The Register page contains student's number, full name, email address, telephone number, major, desired exam schedule, and a self-portrait (max. size 2 MB). If the participant has registered, he/she can choose to submit and will go to payment verification, by filling in the bank name, transfer date, and proof of transfer in the form of a photo. After successful registration, the password for the exam will be sent to the registered email and there will be a link containing the Ms. Teams group. On the specified exam day, participants can login by entering the username and password from the email sent by the application.

After waiting, participants can work on the questions given. The questions consist of five categories with each containing ten questions. The total number of questions is fifty with a processing time of 60 minutes or one hour.

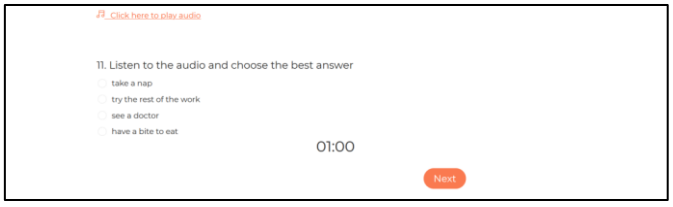

Figure 10. Listening Question Example

After completing the work, a notification page will appear and participants are the participants are invited to log out, as shown in the image below:

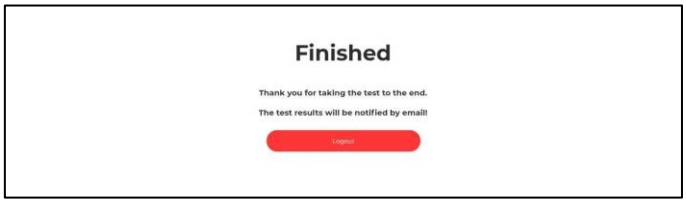

Figure 11. Notification page

Administrator Page Display

Figure 12. Admin Login page

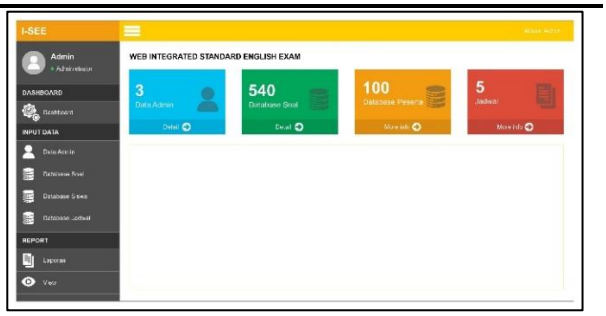

Figure 13. Admin Dashboard page

On the Administrator Login page, there are two fields: the username and password fields. Admins who have been registered by super admin can log in using this data. After that, the admin can enter the admin dashboard page and carry out various types of management, such as managing questions, managing schedules, managing students, and so on.

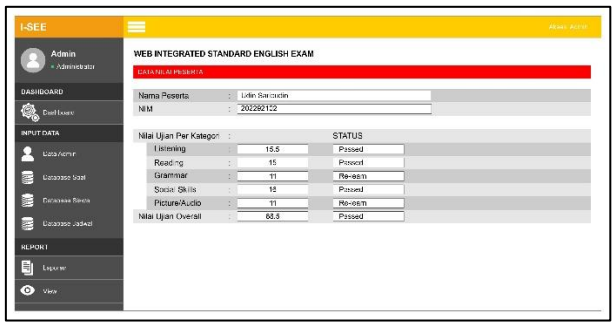

Figure 14. Score page

On the scores page, admins and tutors can see participant exam results per category, so they can determine the participant's skills map. Later, the results of the scores per category and overall will also appear on the participant's exam certificate. This will also be followed by making a schedule for participants whose categories must be re-learned.

CONCLUSION

Based on the results of the description above, it can be concluded that the development of the I-SEE English exam system using the Extreme Programming (XP) method and the CodeIgniter framework can help education administrators carry out their duties more regularly and neatly. This can also save several expenses, such as costs, human resources, and time. This type of web-based exam will be able to cut expenses on various things, namely human resources, use of facilities and infrastructure, zero paper usage, and time. In addition, an assessment system based on categories will be able to map the strengths and weaknesses of each participant, so that English learning can be more focused and directed at improving the participants' lack of abilities. Tutors will also find it easier to provide material because the class is filled only with re-learners in that category. This is clearly beneficial because the learning process will not be hampered by the problem of class domination by participants who already understand. Tutors have a clear starting point in conducting learning and with fewer re-learn participants, attention to improving the abilities of each participant will be better and deeper.

ACKNOWLEDGEMENT

The team would like to thank the Bureau for Research and Community Service (LPPM) Institut ateknologi PLN (ITPLN) for the support, both moral and material, in realizing this research.

REFERENCES

[1] Alrefaai, I. K. (2016). *EFL Teachers Perspectives of Online Testing: Advantages, Challenges and Suggestions for Improvement*.
[2] Ayuba, H., & Masae, A. (2022). Development of Web-Based English Proficiency Test Model for EFL

Classroom. *Al-Lisan*, *7*(1), 17–36. https://doi.org/10.30603/al.v7i1.2504

[3] EF EPI. (2022). *The world's largest ranking of countries and regions by English skills*. English First English Proficiency Index.

[4] First, E. (2023). EF EPI 2023 – Indeks Kecakapan Bahasa Inggris EF. *EF English Proficiency Index*, 27.

[5] Hanifah, N. (2014). Perbandingan Tingkat Kesukaran, Daya Pembeda Butir Soal dan Reliabilitas Tes Bentuk Pilihan Ganda Biasa dan Pilihan Ganda Asosiasi Mata Pelajaran Ekonomi. *SOSIO E-KONS*, *6*(1), 41–55.

[6] Hapsari, A. (2019). Language Learning Strategies in English Language Learning: A Survey Study. *Lingua Pedagogia, Journal of English Teaching Studies*, *1*(1), 58–68. https://doi.org/10.21831/lingped.v1i1.18399

[7] Letwoski, J. . (2014). Doing database design with MySQL. *Journal of Technology Research*, *6*(February), 1–15.

[8] Mishra, L. (2016). Focus Group Discussion in Qualitative Research. *TechnoLearn: An International Journal of Educational Technology*, *6*(1), 1. https://doi.org/10.5958/2249-5223.2016.00001.2

[9] Muttaqin, S., & Chuang, H.-H. (2022). Learning expectations, challenges, and strategies of university students on English-medium instruction. *Journal on English as a Foreign Language*, *12*(2), 272–294. https://doi.org/10.23971/jefl.v12i2.4041

[10] Ridwan, M., Sinaga, T. H., & Elsera, M. (2022). Penerapan Framework Codeigniter Dalam Perancangan Aplikasi Manajemen Iuran Perumahan Griya Mandiri. *Djtechno: Jurnal Teknologi Informasi*, *3*(1), 49–58. https://doi.org/10.46576/djtechno.v3i1.2196

[11] Romney, S. (2015). Penerapan Metode Extreme Programming Dalam Perancangan Aplikasi Perhitungan Kuota Sks Mengajar Dosen. In *IKRA-ITH Informatika* (Vol. 3, Issue 1, pp. 106–113).

[12] Sakkir, G., Abduh, A., Andrew, M., Muslim, A. B., & ... (2021). The Challenges Faced by Teachers in Teaching English in The Current Curriculum Change. *Seminar Nasional LP2M …*, 513–523.

[13] Satoto, K. I., Isnanto, R. R., Kridalukmana, R., & Martono, K. T. (2006). Optimizing MySQL. *Database Design Manual: Using MySQL for Windows*, 151–161. https://doi.org/10.1007/1-85233-859-8_13

[14] Setiawansyah, S., Sulistiani, H., & Saputra, V. H. (2020). Penerapan Codeigniter Dalam Pengembangan Sistem Pembelajaran Dalam Jaringan Di SMK 7 Bandar Lampung. *Jurnal CoreIT: Jurnal Hasil Penelitian Ilmu Komputer Dan Teknologi Informasi*, *6*(2), 89. https://doi.org/10.24014/coreit.v6i2.10679

[15] Shijun, C. (2022). Consequences, Impact and Washback of CET Test Within Assessment for Use Argument to Validation. *International Education Studies*, *15*(4), 42. https://doi.org/10.5539/ies.v15n4p42

[16] Siew Eng, L., & Jiaxi, L. (2022). Challenges and Strategies for English Language Learning in a Higher Education Institution in China. *BERJAYA Journal of Services & Management*, *17*(January), 21–41.

[17] Trisnadoli, A. (2021). Implementasi Extreme Programming (XP) Agile Software Development pada Pengembangan Sistem Informasi KELUARGAKU. *Jurnal Informatika Universitas Pamulang*, *6*(2), 305–311.

[18] William, B. (2012). Evaluating the efficacy of focus group discussion (FGD) in qualitative social research. *International Journal of Business and Social Science*, *3*(7), 54–57.