

# Education 4.0: Android-based application for Teaching English to Polytechnic Students

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## Article Info

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## Abstract:

Responding to the needs of Industry 4.0, a new paradigm arises: Education 4.0, which is keeping up with the potential of digital technologies and mobile learning. The focus is now shifting to the use of the Android platform as it is widely used by today's college students. The researchers developed an Android-based 'Technical English' application to support English teaching and learning process in Shipbuilding Institute of Polytechnic Surabaya. This application is also equipped with attractive visual images, dictionary and menu designed specifically for each study program. The software used in this research is ReactNative and its development method is based on the System Development Life Cycle (SDLC) prototyping model. The result shows that the application has positive orientation in terms of ease of use, design, materials, and learning improvement. This also proves that Technical English app is good to be applied in English classes as it can motivate students to learn English and improve their skills.

**Keywords:** Android, education, English, polytechnic

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## I. INTRODUCTION

In the age of fourth industrial revolution that is popularly known as "industry 4.0", innovative technology emerges and changes the blueprint of almost all aspects, including education. In the sector of higher education, the Internet broadband connectivity and affordable mobile devices initialize a trend of transforming how teaching and learning is performed[1]. Responding to the needs of Industry 4.0, a new paradigm arises, namely Education 4.0, which is keeping up with the potential of digital technologies and Massive Open Online Courses (MOOC)[2]. Within this new paradigm, a number of academics and practitioners realize that more emphasis must be placed on enhancing learning through technology, focusing on the use of mobile learning.

Recently, there have been more and more mobile applications spread widely and used by teachers and students to accelerate learning. It was reported in recent year that 50 billion applications were downloaded from iTunes App store in which half of them were applications for language learning[3]. Furthermore, reports showed that in the last quarter of 2017, the Android app marketplace hit a best quarter, claiming a shocking 19-billion-downloads. This is enormous download numbers came from India, Indonesia and Brazil[4].

The huge number of applications downloaded by Indonesian users is also supported by the fact that most college students have Android phones where they can download a variety of interesting and useful applications[5]. The majority of students in Shipbuilding Institute of Polytechnic

Surabaya have been using smartphone with android operating system since they were in senior high school. From interviews conducted with 300 students, 273 students use Android-based smartphone and most have even used apps they downloaded from PlayStore to simplify their learning activities such as calculator, English dictionary, and document scanner[6][7].

With these technological developments, it is possible to develop Android-based applications that can be easily downloaded by students to learn English wherever and whenever they want. This is a great opportunity to make learning English more fun and interesting so that students are motivated to learn English both inside and outside the classroom.

There are currently some Android apps like DuoLingo, Engineering Dictionary, and Learn English Conversation. In DuoLingo, students can learn about English vocabularies and phrases in a very fun way. There are options about how long the students want to learn using the application. However, this application does not include English Engineering vocabulary. In another application, namely Engineering Dictionary, students is exposed to a list of words related to engineering. However, this app covers definition only and it does not facilitate students to learn about processes related to the technical terms. As for Learning English Conversation, it does not specifically provide engineering or technical vocabulary that are needed by Polytechnic students.

What is really needed by the students of Shipbuilding Institute of Polytechnic Surabaya is an application which covers dictionary of technical terms, video of the process, reading and listening exercises specifically designed for every study program. Therefore, the researchers developed an Android-based 'Technical English' applications that is eligible to be used to support English teaching and learning process in PPNS. This app does not only cover Engineering

vocabulary in general, but specifically in the field of Maritime, Electrical, Safety, and Manufacturing. It is expected to be a great alternative tool for students to improve their speaking, writing, and listening skills of students in communicating using the terms in the field of Engineering. This "Technical English" is also supported by attractive images and videos, and even more interesting, the menu or content is specifically for each study program in PPNS. Thus, with this application students are more motivated in learning English outside the classroom.

## II. METHODOLOGY

The researcher uses the SDLC model as the method for developing "Technical English" application. It comes with a set of development phases in which each phase uses the results of the previous one[8]. The phases are analysis, designing, programming, testing and maintenance. As SDLC has been around for a long time, many variations have been created, starting from Waterfall, prototyping, to the newest model[9]. However, for this research, prototyping model is used because of the advantages it offers.

The prototyping model offers the best approach since the researcher is unsure of the efficiency and the adaptability of "Technical English". The prototyping paradigm begins with requirements gathering. Here the researcher meets with the English lecturers and students as users to define the overall objectives for the software, identify the requirements, and determine some areas where further definition is mandatory. The prototype is evaluated by lecturers and students and then used to refine the needs of "Technical English" to be developed. Iteration is needed as the prototype is built to satisfy the needs of English teachers and students. Meanwhile, it also enables the researcher to better understand what requirements to be done [10].

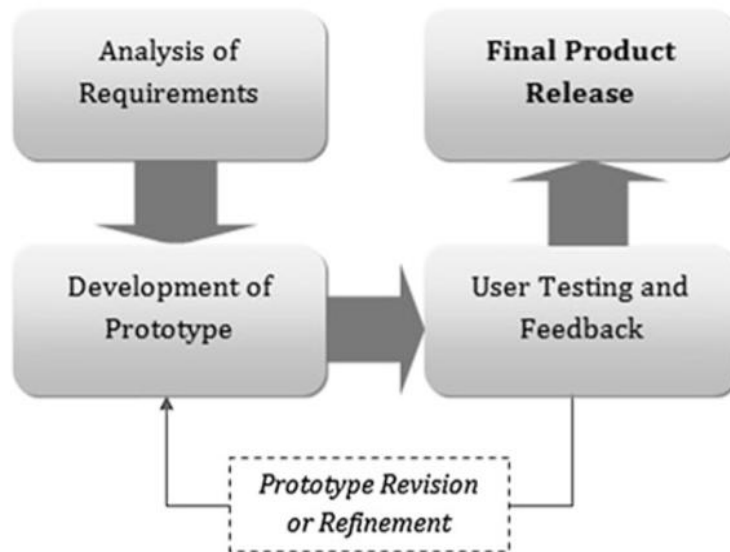


Fig. 2.1. The prototype model adapted from [8][9][10]

### 2.1. Analysis of Requirements

At this stage, the researchers gained information regarding the students, lecturers and the materials taught in every study program. In order to obtain this information, observations and interviews were conducted with lecturers and students in the subjects of interest. Moreover, analysis of the English vocabulary that is presented in the Technical English android application was conducted. Several aspects of learning were also planned, starting from determining the Competency Standards, Basic Competencies, indicators and learning objectives.

### 2.2. Developing the Prototype

When the need analysis of the materials is completed, the next step is to develop the prototype of the Technical English application. The software used to develop the "Technical English" app is React Native. React is an open source JavaScript library used by developers to create web user interfaces. React Native assists developers to build mobile apps by using only JavaScript. It uses similar design as React, enabling developers to compose a rich mobile user interface by combining fundamental user interface building blocks together with the assistance of JavaScript and React. This initial product is then

validated by media experts and materials experts. The purpose of the validation is to obtain input and justification from experts related to the validity of the material and strategy for presenting material through the application.

### 2.3. User Testing and Feedback

The User Testing and Feedback stage is a trial phase of the Technical English app. The app was used by 120 students in 4 different study programs, namely Safety Engineering, Marine Engineering, Electrical Engineering and Shipbuilding Engineering. This process also involved at least 4 English lecturers. Lecturers and students' responses were obtained through interviews and questionnaires to determine the feasibility of the application in the English learning process. Moreover, through questionnaires and interviews, suggestions for improvement of the app were also obtained.

### 2.4. Product Revision

This stage is the stage of improvement based on the response and suggestions from lecturers and students.

### III. Technical English Application

#### 3.1 'Technical English' Menu

The researchers set up the menu of "Technical English" app by considering the main 4 majors in PPNS, namely Shipbuilding engineering,

Electrical Engineering, Marine Engineering and Safety Engineering. When the app is started students are presented with 4 different majors where they can choose based on their affiliation. The Screenshot of the initial menu is depicted in Fig 2.2:



Fig. 2.2. The Menu of Technical English'

When students choose one of the disciplines, they will come to a Quick Guide menu where a set of terms related to their study program is presented. When they choose one of the terms, they will be provided with a definition along with the image, video, as well as related words. Here they will learn how making a definition. This will

go hand in hand with the Quiz, where students are asked to write the definition of certain words. Consequently, their writing ability will improve. The 'Quick Guide ' including image and video are depicted in Fig 2.3 and Fig 2.4.

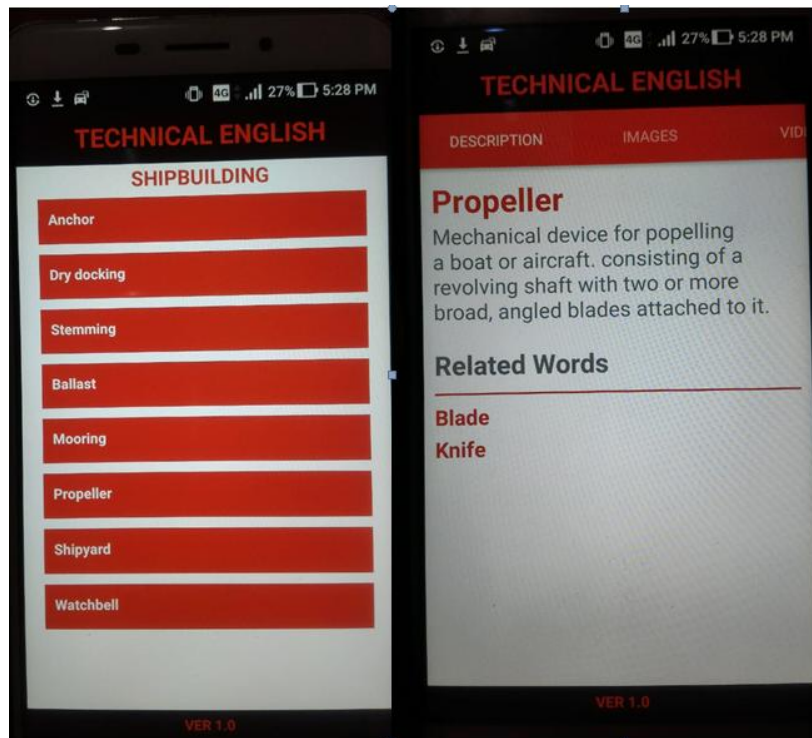


Fig. 2.3.Shipbuilding quick guides and Definition with Related Words

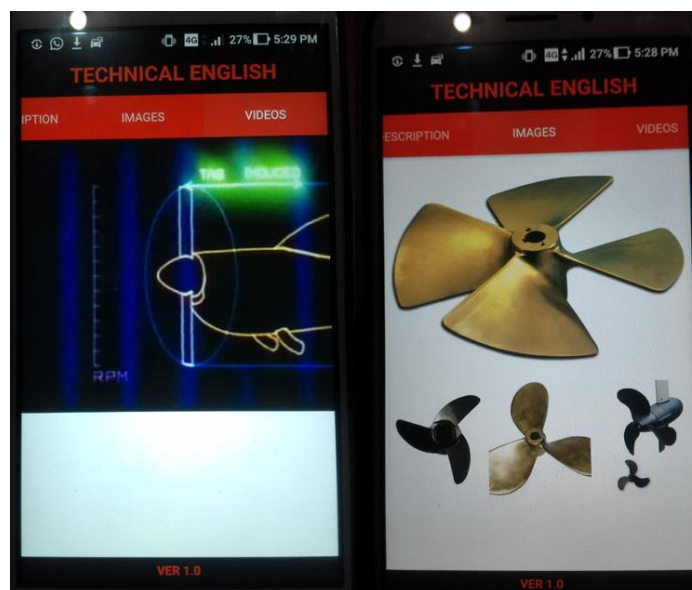


Fig. 2.4.Image and Video explains the word

### 3.2 Students' Perception

After the prototype of 'Technical English' is built, students and lecturers then gave feedback on it. Here the researchers use Likert scale items of the questionnaire. The questionnaires were proven to be reliable ( $p= 0.77$ ). On the other

hand, minutepapers were analyzed by using coding method of content analysis. Positive orientations were found.



TABLE I. Positive orientations of 'Technical English'

No	Aspect	Score	Category
1	Design	31.80	Good
2	English Materials and Activity	34.84	Good
3	Learning Improvement	25.19	Good
4	Ease of Use	12.68	Good

When the researchers analyzed the student feedbackquestionnaires, it was found that most of the students thought using "Technical English" helped them revise their improve their English. Other students were of the opinion that this application has an appropriate English vocabulary they need related to their major. Some other students highlighted that the application is easy to use and has an entertaining element in its design.

#### IV. CONCLUSION

The industry 4.0 has brought a new approach in education where mobile learning has proven to be effective to enhance students' learning. When it comes to teaching polytechnic students, android application is considered an effective tool to motivate them to learn English. By using the SDLC prototyping model, the researchers developed an Android-based 'Technical English' application to support English teaching and learning process in Shipbuilding Institute of Polytechnic Surabaya. This application is also equipped with attractive visual images, dictionary and menu designed specifically for each study program in PPNS. Students' perception of the application leads to positive orientations of the application. Hence, in the future it can help students improve their English skills.

#### V. ACKNOWLEDGEMENTS

We give our sincere thanks to all English lecturers in Shipbuilding Institute of Polytechnic Surabaya and also students who helped evaluating the needs of developing Technical English app. Working on this reserch has been a great learning experience for us. We hope that future researchers can also

adopt and develop this application for enhancing teaching and learning process in Polytechnics.

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