

# Developing Mobile-based Career Counselling Applications: a Tool for Assisting High School Students on Career Decisions Making

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**Abstract**— The difficulties of career-making decisions are experienced by high school students in Indonesia, especially in making choices for advanced education. Mostly, students are still confused about choosing what major is appropriate for continuing their studies in college because they have not yet received sufficient information as a basis for it. The difficulties in obtaining the information can be helped by utilizing information and communication technology (ICT) in career information services for students in the form of mobile-based applications. This study aims to develop mobile-based career counseling to assist students in choosing a major in college. This application can be downloaded by mobile phone. This application has four main features: assessment, study information, career counseling, and other info. The research method used Research and Development (R&D) with the ADDIE model. There are five fundamental stages, including analysis, design, develop, implementation and evaluation. Need analysis was conducted on 573 respondents. After the application design was developed, testing was carried out by experts in counseling, experts in software engineering, and users (N = 40) who are students from the school. The results showed that the mobile-based career counseling application is feasible and very helpful for students in making career decisions. It is more efficient in assisting students in determining advanced education options. It will ease the work of school counselors in providing career counseling services. For further study, the need to experiment to compare the effectiveness of career counseling by application and directly counseling.

**Keywords**— ADDIE model; career decision making; mobile-based career counseling.

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## I. INTRODUCTION

The trend of using ICT in counseling has received much consideration and acknowledgment as a reasonable counseling conveyance strategy over the past two decades [1]. The counselee feels that online counseling is satisfied with its services [2]. By utilizing ICT in counseling, service coverage is broader even beyond geographic boundaries and physical limitations [3], which is faster, more efficient and less expensive [4], convenient [5], and more effective [6]. Online counseling in schools aims to help students overcome problems relating to psychological and academic problems. Among the issue often faced by students who need counseling are career problems [7]. Many students have difficulty making career decisions. Most students in Indonesia experience difficulties in making career decisions, especially in continuing further education[8]. Similar conditions have also occurred in many countries like as in French [9], Turkey

[10], Australia, Canada, China, India, South Africa, the United Kingdom, the United States of America[11], and Israel [12]. To help overcome career decision-making difficulties, a career counseling service is needed. Counseling services can be conducted face-to-face or online. Online counseling has developed and is increasingly used [13], [4] because more benefits include cost-effectiveness and improved access to resources and support. Initially, online counseling services were provided via email [1]; hence in its development, online counselling started using the web, but in advance, application is prefer to use [14]. Although online counseling is broadly utilized, it is intended to overcome various psychological problems, such as depression [15], drug abuse [16], and other various psychological problems [1]. Meanwhile, online counseling for career fields is relatively limited [13]. Too [17] has developed a mobile application for personality-based career guidance or provides counseling services without assessment [18].

The limited mobile-based online counseling drives researchers to develop mobile applications for career counseling services. It will help as many students as possible in making career decisions, and then so that fewer students choose the wrong department. The application was developed by combining counseling and career guidance services based on an assessment of the potency of each student encompassing personality, talents, interests, and academic abilities. Career tools or career counseling sessions can be as effective as the more traditional, face-to-face career counseling services [13].

In the comprehensive counseling approach, career counseling is an important part of guidance and counseling services in schools [19]. Career guidance guides each student to be able to prepare himself to be ready for the transition to education and the transition to the world of work [20]. Students are helped to prepare themselves to choose further education as the basis for choosing a field of work,

Generally, career guidance service activities are carried out directly and face to face. However, given the limited amount of time provided for school counselors to provide complete and comprehensive mentoring, often career guidance services do not reach all students. The use of information technology is very helpful for school counselors in providing career guidance services. Utilizing ICT in career counseling was very helpful for the student in many countries in making career decisions [21]. Online intervention can be carried out at the time, place, and pace most convenient for the individual [22].

Online career counseling is developed in different forms and objectives; for example, the career assessment provides various information and the selection of education at the tertiary level. Hence, multiple studies have suggested the internet-based career assessment for a similar test to be equivalent to paper-and-pencil administered versions [5]. The online assessment that can get free will help the individual deliberate about their career choice. The score where get from the assessment will be interpreted and recommended. It helps the individual to understand their choice [22]. Career counseling sites not only replace the face-to-face counseling method but also help individuals to seek counselor help and guidance in the virtual world, such as through counseling chats and counseling emails. Various tools, career information, career planning, and career decision-making, can be used [23].

Online counseling has advantages relating to accessibility, convenience, privacy, and mobility, were some significant benefits. Counseling and tools in career guidance services are generally divided between providing an assessment for the choice of further education or choice of work and the second type of providing career counseling services. Students are expected to become clients and get an online career counseling services application model. Too [17] developed a mobile application containing personality assessment to help secondary school students to have self-awareness about their personality as a basis for their career selection. This will be achieved using Holland's instruments, the Self Direct Search (SDS), and the Vocation-al Preference Inventory (VPI) to match students to career possibilities.

Pordelan and Hossenian [18] have developed a website and mobile career counseling application to provide career

counseling interventions for students in Iran. Students can find online career counseling services. Twenty career counseling experts tested their products, 20 software engineering specialists, then tested on 45 students. The results show that online career counseling is very helpful for students in making career decisions

Both of these products provide advantages to their users; Too [17] provides services in the form of understanding personality, Pordellan and Hossenian's work provides career counseling for helping students to obtain career decisions. So far, products that combine assessment and counseling services have not been developed much, even though students feel the need for assessment and counseling services so that students receive broader service assistance[24].

In this research, we developed a mobile-based application for career counseling services through an R&D procedure. This application assists students in understanding themselves through assessment and career counseling services to assist in making career decisions. The initial procedure begins with a need analysis as the basis for product planning and development, and then various tests are carried out by experts and limited user testing.

## II. MATERIALS AND METHOD

### A. Development Model

The application was developed based on R&D research method with the ADDIE model. The ADDIE model consisted of 5 fundamental stages: analysis, design, development, implementation, and evaluation. At the analysis stage, we used five questions regarding the need analysis of the application in the form questionnaire and interview for data complimentary.

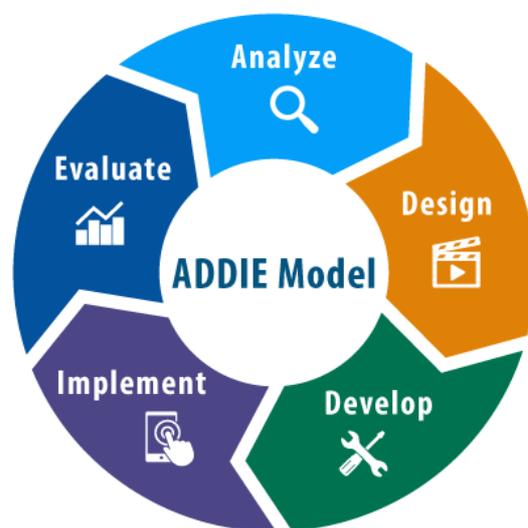


Fig. 1 ADDIE model

### B. Validation of Contents and Design

The application was validated twice to ensure content validity and design usability before the implementation. The validation is required to avoid concept misunderstanding among students, so the result of the research can be academically accepted. There were three aspects examined, including software design (7 indicators), visual

communication (9 quality indicators), and instructional design (5 quality indicators).

### C. Usability Test

The usability test that was measuring the easiness of the application. The System Usability Scale (SUS) was initially developed by Brooke [25] to evaluate the system usability of a product or service and consisted of ten questions based on a Likert scaling rule. In the initial product development stage, validity assessment involved five counseling experts and six software engineering specialists. In the field trial phase, the user was tested by 40 students selected to assess the product. The instrument for testing the validity of the content has three aspects material and has 13 items. The instruments used to assess the usability of specialist engineer software has three aspects Design, Sensibility, and Easy to Use. There is different instrument to assess usability from user perspective has four aspects: Quality of Content and Purpose, Level of Importance, Usefulness, and Learnability.

### D. Data Analysis

The data obtained through the need assessment were analyzed with a percentage, and the data from the interviews were analyzed using the content analysis procedure. The important thing to obtaining information related to student needs for career counseling is reviews and suggestions from material experts and media experts following the development procedures carried out [26]. Measurements made on the experts use a Likert scale with a rating of 5 = highly feasible, score 4 = feasible, score 3 = moderately feasible, score 2 = less feasible, score 1 = unfeasible. The components of the media aspect, counseling material, and career exploration. The number of material expert validation is the sum of each item statement's scores multiplied by the weight of the score according to the Likert scale [27]. The Instrument that was used has a validity  $r = 0.572 < 0.05$ . This data is taken from the start of the distance learning program on January 16, 2020. Students can use the instrument on Field tests using a rating scale.

## III. RESULTS AND DISCUSSION

### A. Need Analysis

Need analysis aims to determine the needs of prospective users to identify the applications that will be developed. There were two techniques used, questionnaire and interview. Participants who have fulfill questionnaire are 573 (402 = male, 171 = female), grade 10 = 229/40 %, grade 11 = 181/31,6 %, grade 13 = 162/28,4. Questions that need analysis begin with their need for an application containing information on career, delivery, interface preference, and preferable features in the Application.

The initial questions about the kind of mobile they used are mostly Android users (75,4 %) and 24,6 % who use IOS. For the question about developing an application for further study, most respondents answer strongly agree (58 %) and agree (34 %), and only 2 % answer not agree.

The form of navigation expected by potential users is mostly scrolled up and down (65.1%), followed by the previous and next button forms (21.8%), and finally, page-flipping is 13.1%. Most of them expect the menu in the

application to be a combination of an icon and the word deaf san (92.7%). The devices make use of a platform that contains applications. Most of the respondents answered that they hoped that the application could be used either by using a computer or a cellphone (92.8%), and the rest simply used a cellphone.

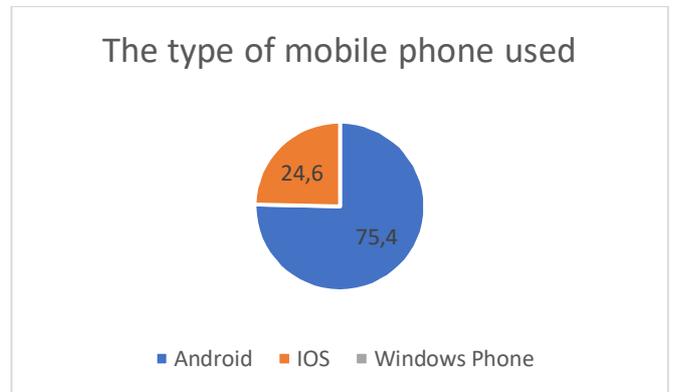


Fig. 2 The Type of Mobile Phone Used

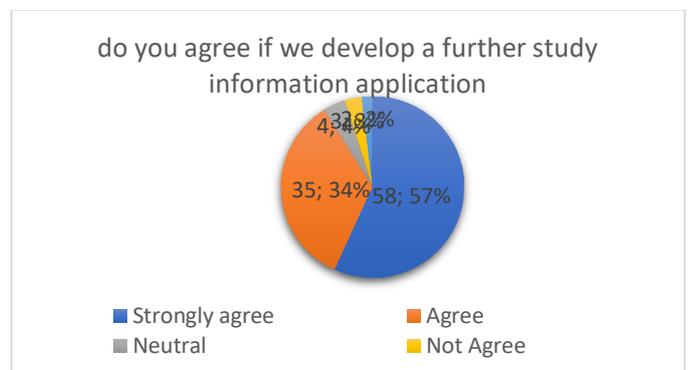


Fig. 3 Needed for Career Information Application

TABLE I  
DELIVERY AND INTERFACE PREFERENCES

| Interface preferences                            | Types of App              | (%)    |
|--|---------------------------|--------|
| I prefer the navigation of the content app using | Page flipping             | 13.1   |
|  | Previous and next buttons | 21.8 % |
|  | Scroll up and down        | 65.1 % |
| I prefer the Main Menu in the form of            | Both                      | 92.7 % |
|  | List of icons only        | 5.1. % |
|  | List of words only        | 2.3    |
| I prefer to have the app designed for            | Both                      | 92.8   |
|  | Mobile phone              | 6.6    |
|  | Desktop                   | 0.5    |

For questions regarding the features respondents want in the application to be developed. The most expected feature in the application is the recommendation for further education (86, 7%), meaning that the respondents expect the application to provide clarity about what study program they will choose after graduating from high school. The next feature is the strategy to pass State University by 85.3% and videos about education and career information by 84.1%.

TABEL II  
THE PREFERABLE FEATURES IN THE APPLICATION

| Preferable features   | Frequency | %    |
|---|-----------|------|
| Psychological assessment  | 456       | 79,6 |
| Recommendation for advanced education                           | 497       | 86,7 |
| Video for information education and career                      | 482       | 84,1 |
| Articles about university                                       | 434       | 75,7 |
| Chatbot with school counsellor                                  | 279       | 48,7 |
| Virtual counselling   | 348       | 60,7 |
| Strategies for a pass to favorite universities                  | 489       | 85,3 |
| Information about passing grade each department in universities | 431       | 75,2 |

The other data was also collected through semi-structured interviews to complement data from the questionnaire. As many as ten students were interviewed to get more in-depth information about their needs. To maintain the confidentiality of informants, we use pseudonyms with the following interview results:

"I like singing. Besides that, my strength is to draw. However, my educational goal is accounting. " (L, 2020). "My ability to memorize quickly. After graduating, I will major in psychology. Because the majors are interesting. " (A, 2020). "My father wanted me to register for college after graduation. But I do not know what major I will take. " (S, 2020)

### B. Application Development

The platform for mobile application implementation used Android. The source code was written in Java utilizing Android classes. JavaScript Object Notation (JSON) (www.json.org) was used to provide the linking between the Android application and the database because it is available

and easy, and flexible. As a result, host-based verification and password encryption are also available. Counseling students and teachers can directly click <https://www.edukasikarir.org/> via mobile phones. For software development, the stages used are SDLC (Software Development Life Cycle) [28].

The following are steps for using mobile-based career counseling.

- Select Sign Up Now to register or log in to sign in if user already have an account.
- Enter the data according to the input field, fill in all data, then select Sign Up Now to register; if the registration is successful, a successful notification will appear and will immediately enter the application
- Enter email and password, then press log-in; if the log-in is successful, a notification will appear, and enter the application directly
- After doing the Sign-Up process on the home page, the user completes demographic and academic data and then does an assessment, including personality, aptitude, interests, and numerical and social tests.
- After completion assessment, it will arise profile such as a psychograph of the user and recommendation to advance study in major. Users can access information about the profile of departments and universities that has been recommended.
- If a user is still confused, he/she can continue to take counseling session with the mode his/her prefer: chatbot or phone. Alternatively, he/she can access more information about a career in an article or video.

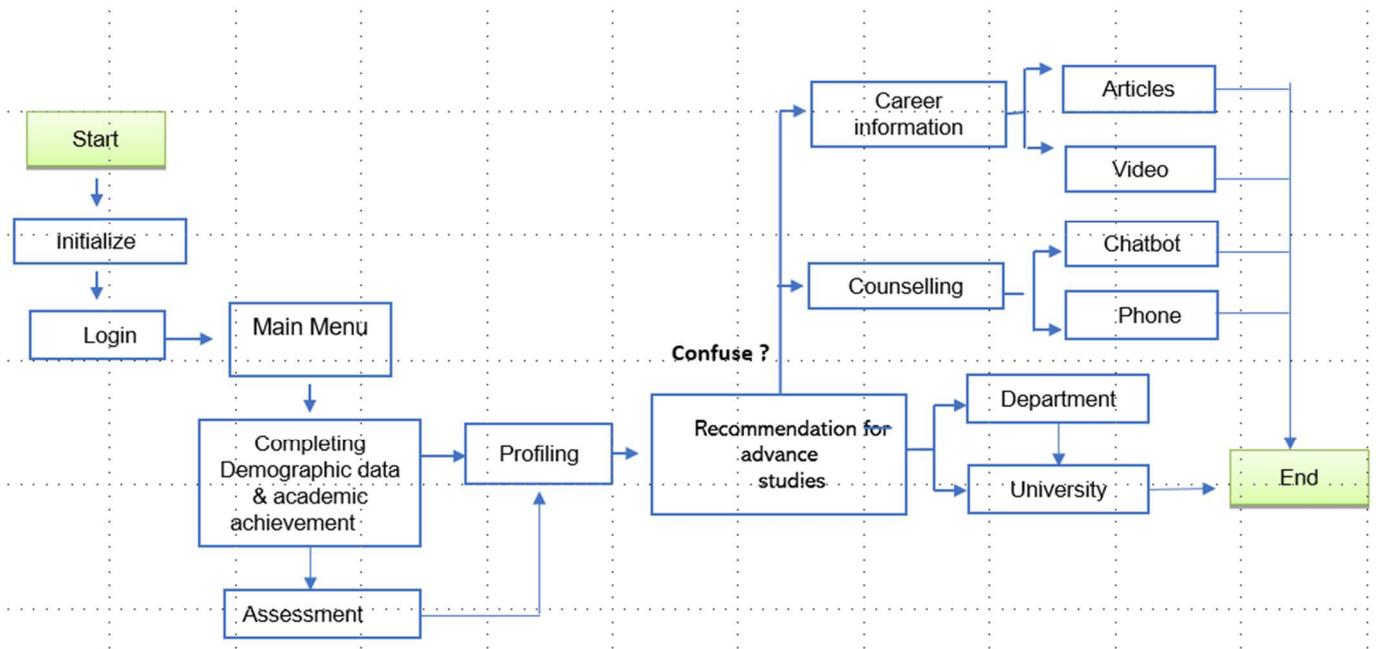


Fig. 4 Flow Chart of The App

In Fig 5. the red button with the words "let takes the test" for starting the assessment. The test button with an image on the side functions to directly enter the test page. To enter the personal data entry page, the user can access it via the button on the homepage and the personal info menu on the account page. Fill in personal data that is still blank, and do not forget to fill in whether users have considered the major or not. If

the user has chosen yes, fill in the confidence level scale from 1 to 9. This application is equipped with an aptitude test, interest test, personality test, and readiness test. The test result will only appear after answering all questions and completing the test by pressing the finish button and verifying that the user has finished working on the test. The product developed is then tested for validity before field trials are carried out on

students and teachers. After developing the edukasikarir.org counseling web product

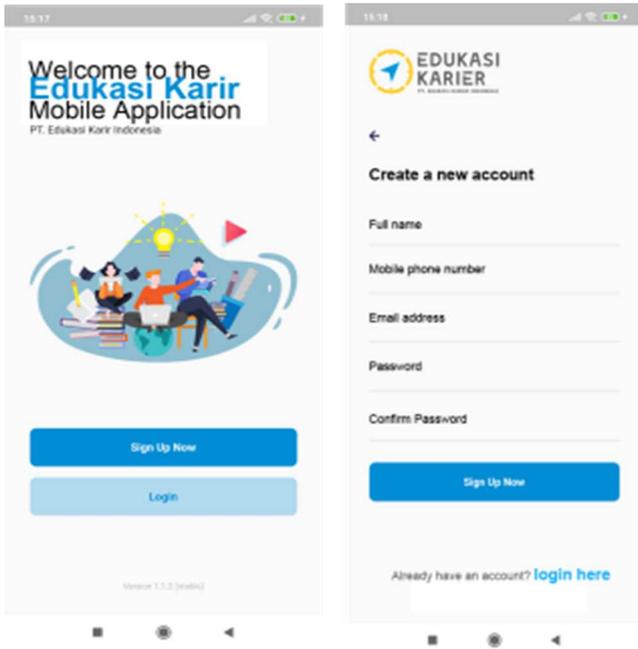


Fig. 5 Sign up for Application



Fig. 6 The Assessment Menu

### C. Media and Content Validity

To examine the validity of the media and content, five experts in the media and counseling experts were tested. The results obtained are in Fig 6 and Fig 7. The results of the media validation test show that the Application EdukasiKarir is feasible and can be used but with improvements. Improvements in display design must be made, namely, the suitability of transparent text displays and supporting images for career readiness material with career planning goals because students need to understand the complex college entry and selection process. Besides that, planning becomes essential to help students understand academic plans according to their talents and interests [29]. After the researcher developed the initial form of the product and carried out the validity test, the average result of the EdukasiKarir validation test by media experts was 77.9% with eligible criteria and can be used but with improvements. In comparison, material experts' average validation test results are 79.07% with feasible criteria and can be used but with improvements. Researchers made revisions to the appearance of the text and the suitability of the material with self-efficacy, opportunities, and job types.

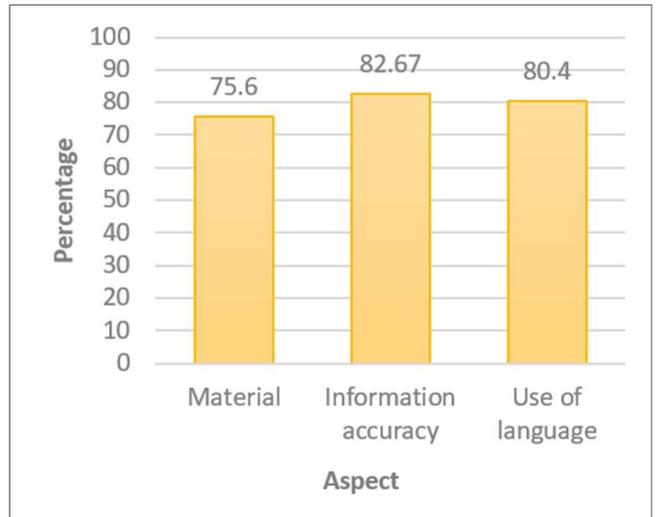


Fig. 7 Opinion of Counselling Expert

Referring to Figure 7, it can be concluded that the Application is a feasible application. Both aspects of the material presented, the accuracy of the information presented, and the language used is good. Overall, the experts stated that the application is feasible to use, although it is still possible to continuously improve the material's suitability with one's abilities, opportunities, and kind of department in the university. Because career readiness is important for students' academic and future success [30], it is hoped that through this web/Application, students can choose the most appropriate department for them as a basis for helping competence in choosing a job after graduation.

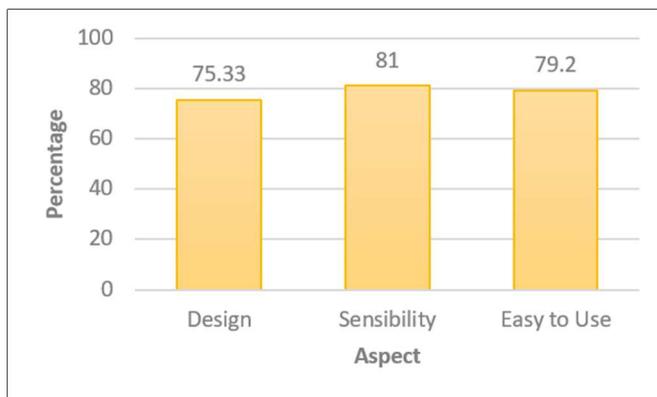


Fig. 8 The Opinion of Software Engineer

Furthermore, researchers conducted field trials on web-based applications EdukasiKarir. This trial was conducted on 40 high school students

#### D. Usability

Field tests conducted on students show that career counseling through EdukasiKarir Application gets an average of 80.5% with excellent criteria. It is shown that the quality of the application developed follows the needs of students. Besides that, the features possessed by EdukasiKarir Application make it easier for students to understand their potential well [31]. Career guidance focuses on life planning by considering one's potency [32]. The need for career counseling, especially for high school students, is significant for choosing a major that suits their abilities. Usually, online counseling cannot be found for various reasons, just for those who need mental health care [33]. So, this online career counseling is an innovation for students to make decisions about their future careers.

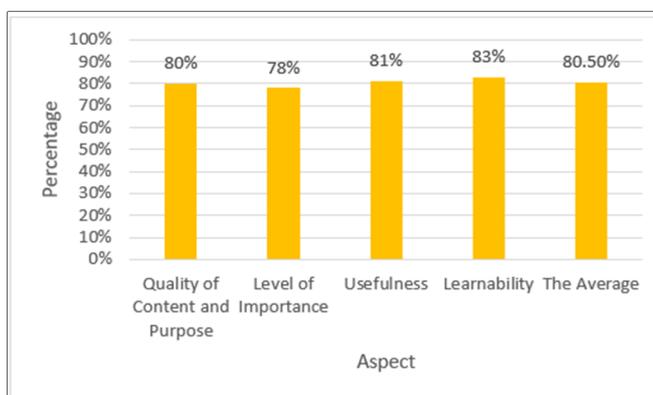


Fig. 9 User Opinion

Career counseling in school helps students gain self-understanding and direction in preparing for work and being useful in society [34] and affects dimensions of career development such as career planning and career attitude [35]. The emergence of information technology is a strength for counseling to be innovated. To answer the research question, we developed a web-based application to support student career counseling [8]. Career counseling aims to make students understand their potential well, know the various jobs and departments at the University [36], and improve confidence regarding job ideas/making career choices [37]. Instead, secondary school students are in their teens,

transitioning from childhood to adulthood. In general, they are not yet independent, so they need help from others to achieve independence[38]. In this connection, they need guidance, including career counseling, to prepare for independence in work [8].

This research offers an alternative approach to career counseling to help students know and understand who they are. Students are expected to know and understand their potential, abilities, interests, aptitude, and aspirations. Even though Christodoulidou [2] research has explained that users show satisfaction in online counseling through appreciation expressions at the end of the chat. This study's results align with Pordelan and Hosseinian[18], who explained that it is possible to design online career counseling. Moreover, online career counseling websites have features that users desire. Also, online career counseling can improve career guidance patterns that are part of student studies' final process. After completing their studies, they need direction, guidance, and learning in choosing and finding their identity in the career world to know where to go and find a suitable career [39]. They will work with pleasure and full of joy if what they do is under their circumstances, abilities, and interests.

The career plan made by a student will always develop following the student's development period. As we know that the more mature the students are, the more complicated their cognitive development will be. Therefore, this study has limitations in the use of language and the lack of signal. Thus, future researchers can focus on designing automated online counseling. In addition, more people can use online career counseling, such as in junior high schools and universities.

#### E. Limitation

The limitation of this study is that the application testing of career counseling has not been carried out by more experts and more students so that the user assessment is more suitable and fits with more varied user's characteristics.

## IV. CONCLUSION

The use of ICT in career counseling helps increase efficiency. For teenage students who have difficulty making career decisions, the existence of a career counseling application is very helpful for them. Career information counseling applications are developed based on an R & D stage. The need assessment results show that students need simple, easy, and efficient applications. The development of this application uses the android platform according to prospective users' needs. Counseling experts and specialist software engineers assess products. The results showed that the application can be used and is feasible. Hence, candidates rated this application as assisting them in making better career decisions.

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