

Framework E-Counseling System Career For Counselor And Students Using Certainty Factor Method

Irwan, Ambiyar, Gustientiedina, Alyauma Hajjah, Yenny Desnelita

Abstract : Adjustment in career counseling guidance into e-Counseling career is required in this rapidly changing digital era. E-Counseling career contents use a system framework for counselors and the students with the help of calculating certainty factor method as an analytical method that can replace the career consultation counseling in direct conduct between counselor and student. In this research, the methods for easy and rapid career counseling content are presented for effective career consulting services. The results of this research will provide efficiency when the e-counseling career system can show that the content development methods of career consultancy are presented in terms of developing guidance and career counseling contexts. The method of content development presented in this research is considered to bring new changes in the method of developing e-counseling career content by using certainty factor method against suitable career chosen by the students.

Keywords : Certainty Factor, Design, e-Counseling Career, Framework System

1. INTRODUCTION

Information study program students who are accepted after graduation is oriented to the demand of industrial markets which require skilled workers. Since the beginning, Information Study Program graduates must be prepared to enter the workforce, in prospect after graduation they will be able to work or to begin entrepreneurship immediately. The presence of counselors in study program to help direct the students psychologically. The counseling works toward the students' future careers is not an easy task, the students must be guided regularly in academic attitudes and performance, so the students will be directed towards their life careers. The guidance programs have become an integral part of the overall education program. With the basic assumption of all students need direction in career planning and the selection of their careers responsibility. The guidance counselor helps provide the students with the specific knowledge and skills needed to meet future career needs. The specialization process aims to place the students according to the right area of expertise, that later will motivate and comfort them throughout the learning process. The appropriate field of expertise becomes the provision in the future when the students enter the workforce. The students have goals and needs that they have to be fulfilled while studying. The needs of the workforce must be able to be mapped/predicted in order to design students' career guidance programs. The career counseling as a process to achieve maximum compatibility between resources, requirements, aspirations or individual interests and real offers in the fields of education, training, social and vocational integration [1]. This research contextually focuses on the application of e-counseling in student career guidance. This paper explores the extent to which ICT is used in providing counseling services in vocational high school education where school counseling is described as a service delivery activity

[2]. The emergence of the Internet and web resources has taken counseling services outside face-to-face methods by using electronic-based counseling services [3]. Sanders [4] define e-counseling as a method of counseling through the media of telecommunications technology such as telephone, internet and teleconferencing so that it becomes clear that the role of e-counseling will be very important in providing counseling services for the students. This activity is designed to provide a variety of services for the students, therefore making schools have good resource facilities for counseling services for the students in need. Where academic development acquires skills, attitudes, and knowledge that contribute to effective learning in the schools, so as to achieve success and understand academic relationships with the world of work, home and in society. This paper focuses on the challenges faced by the students and designs an electronic framework to assist in counseling services. This system is to direct the students to career planning and selection in using ICT (Information and communication technology) and services available through various web environments, counseling in schools needs to be diversified to provide effective web services for all the students who prefer to counsel in the environment on line. The counseling activities at school must be considered and improved effectively to ensure high quality counseling services. The benefits of this research are to help the students in planning and choosing the right career in accordance with the competencies of the students in vocational high schools. This research is a continuation of previous research that focuses on the application model of counseling development and the students' career selection for decision making and consultation [5]

2 RESEARCH METHODS

2.1 Framework e-Counseling System

The internet has become a service, application, information, content, and opportunity. There is no general understanding to assess human doubts on the internet. This research aims to identify the dimensions of doubt and propose a conceptual framework for internet use. The emergence of ICTs has brought diversity in the counseling methodology. E-counseling uses ICT resources to engage clients in counseling services. E-counseling is often referred by many experts as online

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counseling or internet counseling. Therefore, ICT has created opportunities for counseling centers to be established and reach many people around the world. Reference, in [6] states that "technological progress and emphasis on time are limited, cheap care has led to counseling through the use of communication with the internet." Counseling is a necessity and tool that is indispensable in high school education. To explore the world of ICT can be directed to help and shape the students to meet the pace of technology. Ralls [7] shows that professional counselors at school are responsible for providing time schedules to the students, where online counseling services are available, including reasonably anticipated response times. It makes the alternative ways for the students to contact school counselors at other times, including emergencies. [7] E-counseling is an ideal platform for counseling in this technological era to reach the remote students. The theoretical framework that takes place in this research collects the results of the three phases of previous research by applying theoretical principles and comparative analysis. The previous phase consists of empirical and consists of: an instant model of counseling application to help you achieve the appropriate results [8 9]. The framework of the system is designed using a system architecture model that uses an expanded web approach to the four main modules using software that brings back information in the database online and generally calculates the available sizes, indicators and graphs [10]. To find out the use of the certainty factor method with the Backward Chaining method, one uses the Backward Chaining method in the Prologue for expert systems[11]. Module architecture of the system formed in Figure 1. Steps for the e-counseling students and the students as information for each student's career, as follows:

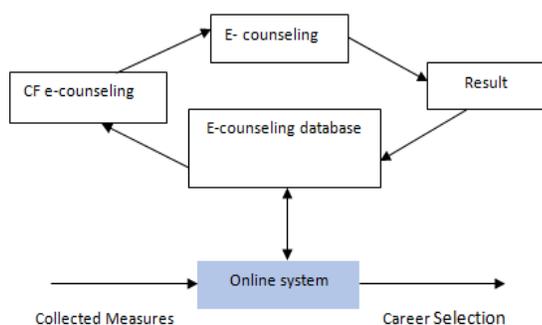


Fig 1. Main Module of E-counseling Career

In intelligent systems based education, the expert system is found as a versatile tool in career guidance and counseling. An expert system approach is useful to help the experts, namely career counselors, as well as truly successful tools for computerization and automation of the students' career counseling reasoning, by exploring the features of expert systems for questioning skills, reasoning power, providing explanations, providing alternative solutions and especially expert systems rule-based that captures human knowledge using If-Then rules in a rule-based knowledge base. This paper provides an electronic approach, a web-based intelligent system, a system that works exactly like a career counselor in reasoning and the system provides a platform that helps and supports the decision-making process independently choosing a career path by interacting electronically with career counselors at any time, where it is only online using the

internet. Web-based career information systems for the students are developed by [12]. Also [13] developed a system known as career masters: decision support systems (DSS) for guidance and counseling that use databases. An online expert system that is adjusted for career guidance for high school students uses jSoup's parsing technique to obtain web page information where web page information is used to develop a knowledge base, which is built by using if-then rules [14]. The review and study of intelligence systems or experts related to career guidance in this paper. The face-to-face interviews were conducted with counseling teachers in vocational high schools. Three parameters that are driven by students for career path recommendations are a combination of favorite science subjects and the results of a career inventory analysis. The data used in formulating various career choices and care questions about career interest and talent inventory for a combination of favorite science subjects by using a combination of vocational or departmental subjects. Meanwhile the database was created for all basic science-based subjects from the department and questions about career interests and talent questions. Each favorite science subject combination is used to recommend compatible programs from a database of all science or department-based subjects. Students are given the questions related to the skills, interests, talents with answers given by the students. The career outcomes are obtained which are used to include careers according to the recommended combination of favorite science; results obtained by using certainty factor method. The results of this reasoning are used to determine whether the students choose a career in accordance with their competencies. This is the results of a career planning analysis.

2.2 Certainty Factor Methods

Career e-Counseling uses the rules of proportional certainty factor representing knowledge. The certainty factor can range in the value of -1 to +1, representing of how many rules increase or decrease confidence in the consequences. The +1 certainty factor shows absolute certainty (true), while -1 represents total mistrust (incorrect) [15]. The rules combine evidence through probabilistic amounts, which are defined for positive evidence, as in :

$$a \oplus b = a + b - ab \quad (1)$$

Assume we also have a rule: $B \xrightarrow{D}$. Given that A and B are correct, our confidence size in D becomes $0.9 (= 0.8 + 0.5 - 0.8 \times 0.5)$. The negative certainty factor is combined using :

$$a \oplus b \cong a + b + ab \quad (2)$$

All positive evidence is combined to determine the size of the measure belief (MB) of a proposition and all negative evidence. All positive values are combined to determine the size of belief (MB) of a proposition and all negative evidence is combined to get a measure of distrust (MD). The certainty factor is then calculated using :

$$CF = (MB + MD)/\min(MB, MD) \quad [16] \quad (3)$$

The certainty-factor rule also contains several antecedents, as in $A \wedge B \wedge C \rightarrow D$. Conjunctions are evaluated using MIN. The minimum certainty factor from between A, B, and C is multiplied by 0.7 to determine the certainty factor. Similarly, the MAX function is used with antecedent disjunction [15]. In

Figure 2 you can see the process of calculating the certainty factor in this paper.

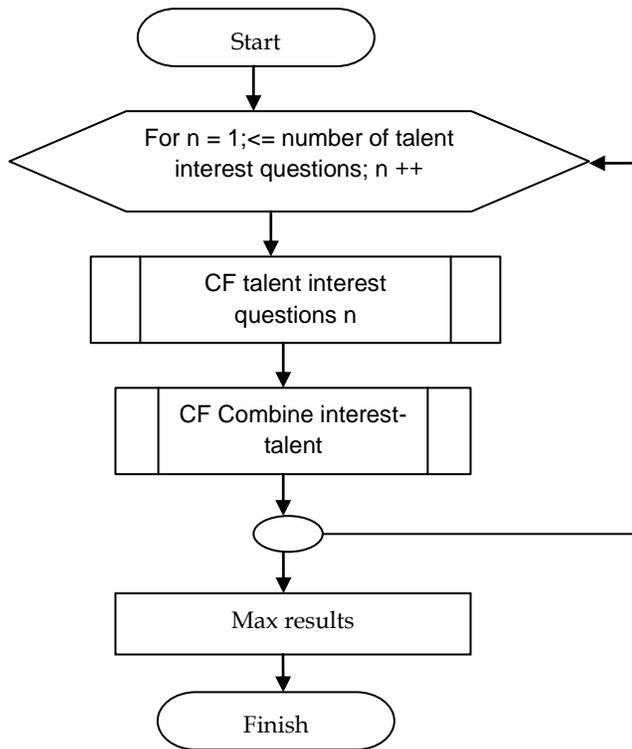


Fig 2. Certanty Factor (CF) Calculation Flow Chart

3 RESULT AND DISCUSSION

3.1 Design Rules

The new system is designed based on the operational principles of a rule-based expert system which involves the use of intelligent computer systems, electronic interactions with career counsellors through computer hardware and software on a client/server (web-based) system. Figure 3 below shows a web-based intelligent career guidance system architecture.

Student Career Guidance and Development

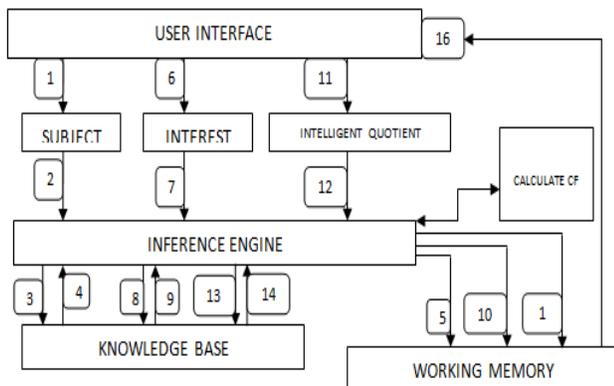


Fig 3. Architèurè of e-Counseling Career Selection

The key to the development of career e-Counseling can be told in the following steps: (1) The subject of the user through the user interface, (2) the inference engine captures, evaluates and checks the available subject, (3) the inference engine matches the subject captured, evaluated and checked

with the right rules in the knowledge base, (4) the inference engine carries out the appropriate rules in the knowledge base, (5) the rules that are activated select relevant subjects in working memory and save, (6) the user enters an appropriate career interest inventory through the user interface, (7) the inference engine captures, evaluates and checks for suitable careers, (8) the inference engine adapts to the career interest inventory selected, evaluated and examined with appropriate rules in the knowledge base, (9) the inference engine carries out the suitable on the basis of inquiry, (10) the rules that are activated choose relevant career interests from the program break the step (5) above and also save the relevant career interests selected in working memory, (11) the user answers the question through the user interface and the results are calculated using the certainty factor method, (12) the inference engine captures, evaluates and tests the results of the career system (e -Counseling), (13) the inference engine adjusts the results captured, evaluated and examined the results obtained with the appropriate rules in the knowledge base, (15) rules can choose relevant career interests from relevant programs stored in the field (10) above and also keep relevant career interests selected in working memory, (16) the relevant career interests selected and saved in step (15) above are displayed to users through the user interface. Input of the system from the user's side through the web page by answering questions and selecting relevant answers, right for questions about the test of career choice in the selection of subjects, asking for careers and Intelligent Quotient tests. Whereas the resulting output contains the results of the projected input process informing the interactive interface with the user, the interface is projected using Hypertext Transfer Protocol (HTTP). This system has a fully dynamic and functional database. Database is created by using XAMPP and MySQL. Career guidance system consists of 8 databases, namely user-records, subjects, career interests, subject matter, career-intest-quiz, intelligence questions, recommendations and descriptions.

3.2 Output From e-Counseling Careers

The output page as shown in Figure 4 is a question that must be filled by the students and Figure 5 is the final result recommended for the students relating to an appropriate career.

Fig 4. Question Related to student interest

The method of certainty factor (CF) serves to track the input of interests and talents then take the value of density (trust) in each interest and talent in accordance with the facts (questions). After obtaining the density value, identification can

be done. In Figure 4 the user interface for the results of the process of certainty factor inference that draws conclusions in the search for solutions

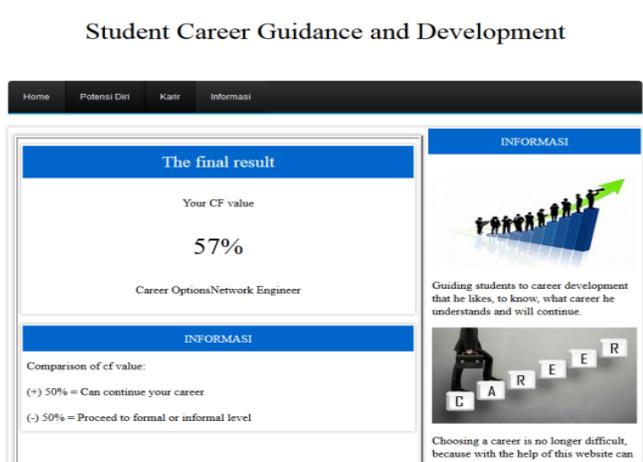


Fig 5. Question Related to student interest

4 CONCLUSION

This research has explored the surfaced difficulties by using career guidance manual methods and several electronic career guidance systems available. This paper provides solutions for some of the conveniences identified by the development of a web-based career guidance e-Counseling system with the operational principle of a rule-based expert system which provides a platform where the students can independently choose career paths by interacting electronically. With career counsellors online anytime, anywhere and on any device, with the use of student-driven parameters such as a combination of subjects of interest, results of career interest inventory analysis, and career decision test results by using the certainty factor method for path recommendations the right career. Career e-Counseling was developed in using a combination of certainty factor findings and expert recommendations. e-Counseling has been tested using the student's data input, their register and their career choice test. The system shows that the career recommended by the system is accurate and relevant. The level of satisfaction for the information provided for career guidance by the web-based career guidance e-Counseling system is satisfactory.

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