



ADAMA SCIENCE & TECHNOLOGY UNIVERSITY

**SCHOOL OF ELECTRICAL ENGINEERING
&COMPUTING**

DEPARTMENT OF COMPUTING

A MASTER'S THESIS

ON

**CAREER GUIDANCE AND EDUCATION SYSTEM IN
ETHIOPIAN HIGHER EDUCATION INSTITUTIONS
DESIGNING CLOUD BASED CAREER GUIDANCE
FRAMEWORK TO USE**

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE
IN SOFTWARE ENGINEERING**

By: Tadesse Dejene

May 2018

Adama, Ethiopia

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May 2018

Declaration

I declare that this study is my original work submitted in partial fulfillment of the requirement for the degree of master of science in software engineering and has not been submitted for any Degree or Diploma in any University or conference. To the best of my knowledge, all source of materials used for the study has been duly acknowledged. I have undertaken the study with the guidance and support of the research advisor.

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List of Acronyms

AAU: Addis Ababa University

API: Application Programming Interface

APIs: Application Programming Interfaces

ASP: Active Server Page

CBCG: Cloud-Based Career Guidance

CGS: Career Guidance Services

EHEIs: Ethiopian Higher Education Institutions

ECG: Education Career Guidance

HEIs: Higher Education Institutions

IaaS: Infrastructure as a Service

ICT: Information Communication Technology

IT: Information Technology

JV: Job Vacancies

MOLSA: Ministry of Labor and Social Affairs

MOE: Ministry of Education

OECD: Organization for Economic Co-operation and Development

PaaS: Platform as a Service

PCs: Personal Computers

QoS: Quality of Service

RIASEC: Realistic, Investigative, Artistic, Social, Enterprising, Conventional

SaaS: Software as a Service

SU: Samara University

WB: World Bank

Abstract

Cloud computing is one of the advancements in technology that increasingly becoming an essential component of any organization's computing strategy. The use of Cloud computing has the potential to expand access to career guidance. In most educational institutions, governmental and non-governmental organizations of Ethiopia, Career guidance is a vaguely applied concept. The strictness of the problem and shortage of relevant information among university students have encouraged the undertaking of this study. The aim of this study was to assess career development among undergraduate students of HEI and developing cloud-based career guidance framework to expand the access to its services. Quantitative and qualitative data was gathered using cross-sectional study design through self-administered structured questionnaires and interviews. The study used 149 participants of which 120 are undergraduate students of AAU, HU, and SU who were recruited through judgment or Purposive sampling and 29 are career experts from AAU. The analysis employed SPSS -22.0 to calculate frequencies and percentage. lack of career experts, lack of common framework and integrated system that help to cost effectively expand the access of career guidance are some of the challenges identified by this study about the career guidance in HEIS of Ethiopia. The result of this study also shows that career guidance is significant in understanding students' personal values, clarifying their goals, career choice directions, and job-searching skills. Therefore, the proposed career guidance system framework was designed using Microsoft Azure-based cloud infrastructure to narrows the gaps of storage, integrated system update cost, scalability cost and the cost required for training career advisors to improve and expand the access of the career guidance service in all educational institutions of Ethiopia.

Keyword: cloud computing, career guidance and education, high educational institutions.

CHAPTER ONE

1. INTRODUCTION

In this chapter background of the research and rationale initiation to do this research has been presented. It presents an overall objective, methodology, the significance of the study, scope, and limitation of the thesis and problem that has to be addressed. finally, an organization of the thesis is presented.

1.1. Background

Nowadays, use of technology become a vital part of life. The Internet creates most of the people tasks much easier and faster. The internet plays an increasingly important role in information, advice and guidance services for people seeking careers, education, training, and employment advice. Most people are able to access the Internet 24/7 by using PCs, smartphones, or tablet even in the developing countries. Increasing access to the internet in Ethiopia makes Young waste most of the time using internet for different purposes including finding their dream jobs. The purpose of using internet for employment service is one of motivation to conduct this research in addition to the weakness of Ethiopia public and private employment services. Ethiopia public and private employment services are unable to provide even basic services such as information to job seekers and employers (National Employment Policy and Strategy of Ethiopia,2009). Moreover, informal mechanisms such as personal networks are common ways of recruitment in Ethiopia, which are subjected to corruption.

Frequent enhancement and advancement of technology would help high educational institutions for picking the actual and expected benefits of Information Communication Technology (ICT). Cloud computing is one of the advancements in technology that increasingly becoming an essential component of any organization's computing strategy. Cloud computing enables small businesses to access ICT-related capabilities that were previously available only to businesses with the capacity to invest large sums on money in IT software and hardware and hire the necessary staff to service and maintain it (Anne, et al, 2012). Organizations including high educational institutions now understand that cloud computing offers the possibility of being able to effortlessly change Information Technology (IT) without expending the time and resources in setting up, configuring, and deploying new systems. This technology offers a more efficient use of resources such as

storage, memory, processing, applications, and bandwidth ensuring high availability, scalability, security, and quality (Buyya, et al 2009).

The use of ICT has the potential to expand access to career guidance. This study makes use of the power of ICT which help job pursuers to make an informed and careful occupational, educational, training and employment decisions. In order to achieve a certain goal, one has to choose for a career that helps him/her to reach his goal. Career is a very important aspect of one's life. His whole life including the life of his family depends on it. Therefore, career issues need to be discussed thoroughly with people or professionals in order to choose the right direction in life. For anyone to have a successful career he or she needs to choose a field that he or she is interested in or have good skills in (Hansen, 2006). Without having the right skills in the chosen field, one can never excel in his field or may never feel content with his job. Career guidance helps people to reflect on their ambitions, interests, qualifications, and abilities. It also helps them to understand the labor market and education systems, and to relate this to what they know about themselves.

In Ethiopia Career guidance within Ethiopian higher education institutions (EHEIs) has historically given low priority and funding as compared to other curriculum areas. The study conducted by Yilfashewa (2011) in Haramaya University found that often there is only one or no Career Advisor in EHEIs who is tasked with delivering institution-wide and timely career guidance to all year levels. The study also has identified that the Career Advisor has moved from a classroom-teaching role into careers education with no specific training or background. However, the negative relationship between the output of graduates from EHEIs and absorption in workforce implies the need for a career guidance system (SCAGES, 1992). In Ethiopia, there has been a significant increase in educational attainment; however, there has not been as much job creation to provide employment opportunities to the newly educated job seekers because of skill incongruity and lack or improper function of career guidance.

The path of choosing the right career should start at a very early stage of schooling, which is ignored in Ethiopia educational institutions. Students choose subjects that are not of their interest but have a great market value and later feel guilty about their choice. Therefore, at every stage of student life, a person should consult a professional or a person with great experience if he is going

in the appropriate direction. Most of the time students want to ask for advice(s) from professionals but do not get the right platform to discuss this matter with them. To meet advice(s), need of all the students around the EHEIs career guidance system framework should be designed in order to provide the students and professionals a common ground to discuss their skills, interests, ideas, and problems that are faced by many people nowadays. Since there is lack of career guidance advisors and lack of integrated system to increase the access of career guidance in EHEIs there is need to cost effective mean to intervene career guidance into educational ecosystem. However, nature of the required integrated system needs a large amount of storage and frequent automatic update since it will be applicable for all EHEIs and employment offices. Therefore, the proposed career guidance system framework should be designed using Microsoft Azure-based cloud infrastructure to narrows the gaps of storage, integrated system update cost, scalability cost and the cost required for training career advisors to improve and expand the access of the career guidance service in all educational institutions of Ethiopia.

1.2. Statement of the problem

The absence of mechanisms for monitoring EHEIs graduate job seekers and facilitating their access to employment in Ethiopia is the major prevailing problem. Ethiopia has suffered from lack of systematic approach to understanding the Young employment challenges of the current school-to-work transition, and further face a lack of accurate and reliable disaggregated data, which could facilitate a prioritization of issues in their programming.

Even though students' career choice, interest, and aptitude are essential factors influencing their success in universities and colleges, the Ethiopian higher education admission system is merely based on university entrance examination results and some affirmative action targeting girls, physically disabled students and students from 'emerging' regions. This results in creating most students who are only looking for certificate rather than finding and developing their skill and ability that helps them to support their country development. However, despite the significant benefit of career guidance, lack of career guidance provision for students in tertiary education was identified as a major problem (Bimal, 2014).

Restricted/costly information flow between employers and job seekers can lead to longer spells of job search and unemployment for new EHEIs graduates. Therefore, understanding how labor

market functions, particularly job search process is crucial to addressing issues of longer spells of job search and unemployment which cannot be achieved without the intermediation of career guidance into the educational curriculum.

In Ethiopia, the majority of employers advertise job openings in newspapers and/or on small boards installed on the busiest street corners and squares of cities in which the employers are located. It is less likely for these types of advertisements to reach out to a large number of new EHEIs graduates spread throughout the country. In addition, there is no communication among employers to coordinate their job advertisements and post them at a specific period of the year, say around the months during which EHEIs students graduate. Rather, job openings advertised randomly throughout the year, which may negatively affect the intensity of job search and, hence, increases unemployment duration (*Yarded, et al, 2016*). On the other hand, senior EHEIs students do not generally start looking for jobs before they graduate because of lack of information about the job market.

Starting the job search early (i.e. while they are still in EHEIs) may help reduce unemployment duration among new EHEIs graduates. That most universities do not have career placement offices to assist graduating seniors in their job search means it is rather difficult for students to initiate such searches. Moreover, in most cases, employers require job applicants to have their degree certificates when they apply for jobs.

Considering the Ethiopian skilled labor market is not well organized, it is worth exploring the role information plays in unemployment duration among new EHEIs graduates. Better flow of information may improve the functioning of the labor market by increasing both the intensity of the job search and the quality of the job match. In this regard, job fairs may be one mechanism to nurture and exploit. However, informal mechanisms such as personal networks are common ways of recruitment in Ethiopia, which subjected to corruption. As a result, employers are not always able to attract the most qualified and most suitable staff. At the same time, qualified people do not find an adequate job if they lack the necessary network contacts. In another perspective, a consequence of the low level of communication with the industries is the challenges of the current school-to-work transition. Hence the main concern of this study will be finding solutions for the

above-mentioned factors so that HEIs can get the advantages of ICT in efficient and affordable manner. Therefore, the study was aimed to answers for the following research questions.

Research Questions

- How the situation of current career guidance looks like in higher education institutions of Ethiopia?
- Does cloud-based career guidance and education system framework save cost for providing cost effective career guidance service in EHEIs?
- Does cloud-based career guidance and education system framework assist students to understand the factual field of study and work that corresponds to their skill and personal values?

1.3. The objective of the study

1.3.1. General objective

- The main objective of this study was to develop a framework that could be used as a baseline to use cloud-based career guidance and education system in Ethiopian Higher Education Institutions.

1.3.2. Specific objectives

The specific objectives of this research were:

- To investigate the situation of current career guidance in higher education institutions.
- To choose the appropriate career guidance theory, deployment and service delivery model by taking scalability, storage, and cost-effectiveness into account.
- To design cloud-based career guidance and education framework.
- To design and develop a prototype which helps students to discover right skill and suggest best field of work that matches their skill and personal values.
- To evaluate framework by evaluating prototype to check its importance in helping students with discovering the right field of study and work that matches their skill and personal values.

1.4. The significance of the study

This paper will be beneficial to the society, more specifically to EHEIs graduates and counselors. The EHEIs students will benefit in the sense that the information system will help and guide them in making wise and appropriate career choices based on their skills and interests and also inform them understand basically what each career is about, what it entails, and the required subjects they need to focus on to succeed in that field. The student will also get benefit from the cloud-based career guidance system framework since electronic portfolio creates online spaces that can serve as repositories for students' university records such as grades/transcripts, course taken, career advising records, students electronic CV, and final CGPA which will facilitate moving data easily between learning and work environments, and to be able to share these resources with others. These enable students of rural and urban to compete equally for jobs that are related to their field of study.

Since competition for job starts early during studying time, the students' university records will also help companies to hire the right employee. Companies can see a record of graduate students on the database owned by MOE, since the proposed career guidance system framework should be administrated and managed by MOE to create link between educational institutions and employment institutions. Therefore, employment institutions have a chance to call for the right job hunter based on their best scores on electronic portfolio and CGPA from MOE database.

Counselors likewise will benefit from the information system as it can serve as a tool for them to use in making the judgment that is more accurate. Counselors will also benefit by asking students to take the career test, and the outcome of the career test can help the counselor give better advice to the students.

In summary, this paper in large extent will help to provide a solution to the subject of career guidance, it will try to provide alternative and complement human councilors, in that it will be readily available to anyone with a device that has a functional browser and access to the internet.

1.5. Scope and limitation of the Study

The main intent of the study is to develop Cloud Computing framework that could be used as a baseline for using career guidance and education in Ethiopia higher education institutions, particularly the system implemented for universities. Limitations of the study are:

- Shortage of time and lack of literature in the area in Ethiopia
- lack of experience to do a research since this is the first instance to do

1.6. Organization of the Thesis

The rest of the study is organized as follows: Chapter two covered related literature on the basic concepts of Description of Career Guidance, Roles of Career Guidance, Career Guidance Approach in Some Countries, Comparison of Career Guidance in Ethiopia and Others, ICT and Career guidance, cloud computing, and career guidance and Related Works. Chapter three describes the research methodology and strategy that aims to identify the potential cloud solutions that could be provided to career guidance in education institutions. It begins by describing research design approaches. Primary data collection and analysis technique were described as information acquisition method. It also describes Programing Language and software tools Used and Justification. Chapter four presents the results of the interview and questioner and descriptions of findings. In Chapter five, backgrounds of a framework for building the proposed Cloud Computing Framework for career guidance, the detail elements of the proposed cloud computing framework and implementation of the prototype. Finally, in chapter six conclusions about the research and suggestions for future research direction were presented.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Introduction

This Chapter covered related literature on the basic concepts of Description of Career Guidance, Roles of Career Guidance, Career Guidance Approach in Some Countries, Comparison of Career Guidance in Ethiopia and Others, ICT and Career guidance, cloud computing, and career guidance and Related Works.

2.2 Description of career guidance

According to International Association for Educational and Career guidance (1992) career guidance refers to assistance given to individuals or groups of individuals in addressing problems related to occupational and life choices, offering full opportunities for personal development and work satisfaction.

A mismatch between the skills initiated by the national education system and those demanded by the workplace has been evident for the need of career guidance in helping young people in their journey for future work. The study of SCAGES (1992) approved 11 activities of career guidance such as informing students about the current and future opportunities of job market advising, teaching, judging, supporting, giving feedback, empowering, networking, managing, and innovation or systems change. Another important role of career guidance in schools is to prepare students for the world of work by equipping them with the right kind of skills so that they may stay relevant and fit in the world economy while leading a purposeful life.

The study of Orndorff RM, et al (1996) discovered that education in corroboration with career guidance have a positive impact on the students' academic performance and well-being for they help them make good decisions regarding their education career. This study also discovered the goals education and career guidance have in common as following.

'to advance students' self-awareness, self-confident and abilities to decide practicable goals, and to study reliably in order to value-add to their future workplace; to help students to search and make decisions based on useable information on the road to their education

and career oriented directions; to Inculcate in their minds the value of utility of education and career guidance for all sort careers and how all these contribute towards the smooth and well-functioning of society; and last, preparing students with the talents and means, so by means of which they may be able to confidently involve their parents and other career influencers’.

According to Watts and Fretwell (1977) Career guidance and orientation services have been defined as facilities intended to support individuals, of any age and at any point all through their lives to make educational, preparation and professional choosing and to manage their careers.

Career information, Career counseling and Career education are basic elements of Career guidance and orientation services. Career guidance in schools frequently emphasizes on career information that provides information on occupations, courses, career paths and labor market information. The purpose of Occupation counseling in schools is to embrace a one-to-one interview. in small groups, it separate career issue faced by individuals such as a career in education, as part of educational curriculum, and consideration is paid to help groups of individuals to develop their competence to manage their career development.

According to Watts and Fretwell (1977) Students are encouraged to learn more about the world of work across different industries so that they may take right steps to obtain their objective and aspirations. Another viewpoint specified that career guidance can be discussed as services and activities planned to assist individuals, of any age and at any point during the course of their lives, to make educational, training and occupational choices and to manage their career.

OECD (2004) describes career guidance as services and activities intended to assist individuals of any age and at any point throughout their lives, to make educational, training and occupational choices and to manage their careers. Career guidance is all about making information about the labor market, education and employment opportunities more accessible by organizing it, systematizing it and having it available when and where people need it. In addition to that career guidance assisting people to reflect on their aspirations, interests, competencies, personal

attributes, qualification and abilities to match these with available training and employment opportunities.

According to Patton and Wend (2005), Career guidance is a word useful across a spectrum of career associated processes which consist of the delivery of information, counseling, curriculum and program interventions such as career education, structured experiences such as work experience, and management of events such as career markets.

According to Hansen (2006), Career guidance is a powerful and effective method of helping to link the gap between education and the world of work, as well as between school and society. It is a means of assistant young people to make right and careful educational selections that will permit them to develop their potential and to have access to employment opportunities that are well-matched with their interests and abilities. Moreover, it can also help to introduce self-confidence and positive attitudes, to arise satisfaction from their chosen areas of learning and work. The possible effects of such efforts include reducing youth unemployment and raising income, thereby reducing poverty.

The role of Career guidance is not only restricted to education process but also realizing the national social and economic development. According to Watts (2010) official Career guidance services are resulting from economic and social development. it plays a vital role in helping education systems and labor-market work in harmonization in order to realize their goals successfully.

According to Jarvis (2011), career guidance assists the young ones in selecting their career in line with their choice and interest thereby making them fit, self-confident and spirited individuals. According to Francis (2011), career guidance allows individuals to measure their aptitude, abilities, character, the level of accountability that suits him/her, interests, wishes and right of way while choosing a career.

According to Tristram H., et al (2011) Career guidance be responsible for a mechanism for relating the curriculum with the learning so that students do in additional activities and their wider life.

Generally, the aim of career Guidance is to assist students to make decisions based on their interests, desire, and abilities, while taking into account current and future career opportunities.

2.3 Roles of career guidance

2.3.1 Roles of career guidance in the development of social economy as well as the efficiency of labor-markets and education system

According to Lapan, et al (1997) career guidance can help improve the competence of education systems, as well as labor markets. Career guidance improves the competence of education systems by increasing access to learning, which results in improve course completion rates, evaluate learning needs and interests, and create common ground for people in contact with learning providers so that they enroll in appropriate programs.

Career guidance can support to articulate better the scale and nature of demand for learning since feedbacks from career guidance experts can inspire learning suppliers to meet the unmet needs of learners and potential learners. It can increase the transparency of learning systems, and their openness to consumer demand. it can also help not only to increase participation but also reduce dropout rates. It has been underlined by some researchers reviewed in this study that career guidance has greatly contributed concerning national educational and labor market policy goals in terms of raising people's interest in education, training as well as enhancing their participation in formal and informal learning. Indeed, this has positive effects on overall learning outcomes such as preparing students with better decision-making skills and making them well aware of learning opportunities as well.

In addition, it has increased job exploration and search activities among people to seek jobs, and thus proved helpful in reducing unemployment by informing them to improve their qualification to seek new kinds of jobs in different areas (Lapan, et al 1997). According to American researchers by American Educational Research Association, American Psychological Association, and National Council on Measurement in Education (1999) providing comprehensive guidance services to students at schools can have an encouraging influence on the quality of students'

educational and professional decisions, and also on students' educational performance and the overall climate of the school.

OECD (2003) investigate that career guidance and education can rise job exploration and information search activities. This suggests the importance of information in refining labor market transparency and flexibility. It also suggests higher recruitment efficiency as the consequence of a better match between individual talents and qualifications on the one hand and the skills and qualifications demanded by employers on the other.

2.3.2 Roles of career guidance in supporting social equity

As far learning of goals, career guidance is important for it supports lifelong learning (for both youth and adults) and the development of human resources to support national and individual economic growth. it strengthening linkages between education/training systems and the labor market.

. Many countries across the globe acknowledge the value and importance of career guidance for it effectively supports education systems and establishes good curriculum and enhances quality human resources for this field as well. Yet another important guarantee of career guidance is about the social equity. According to Killeen, et al (1992) in some countries, such as Finland, Germany, and Norway, it is assumed that career guidance is important because it supports the social combination of refugees and ethnic minorities by bringing coordination between them. It can maintain the integration of disadvantaged and poorly qualified and in employment; it can discourse the rising opposition in the labor market, support rising female labor force participation and address gender segregation in the labor market. Educational qualification and employment are an important determining factor of social mobility and access to them is a significant pointer of social equity (OECD 2003).

Career guidance attempts to make the best use of the use that people make of their talents, irrespective of their social background, gender or ethnic origin. Underprivileged groups are likely to be less aware of main educational and labor market information than more advantaged groups. They may be less skilled in, confident in or used to conveying access to, complex learning systems.

2.3.3 Roles of career guidance to build human capital and employability

Career guidance is not only limited to provide information on jobs and guides students in their decisions but it also helps the youth in selecting their skills needed for developing and executing their long-term goals as a fundamental element of human capital. Career guidance effect on active approaches to assisting unemployed people requiring individual action plans to be constructed. Individual action plans involve job search, education, and training, stressing the ability to find and keep a job, and the personal capacity to adapt to a changing labor market and new job requirements.

According to Collin A. and Watts AG. (1996) Career management skills appear to play an important role in the formation and use of human capital and in the development of employability. According to OECD (2003), career guidance sees a wider concept focusing on the development of career management skills, not just upon immediate decision making as a key policy tool. In order to develop career management skills, career guidance focuses on the importance of replacing passive unemployment benefits with active approaches to assisting unemployed people. The approaches include intervening early in the cycle of unemployment and requiring individual action plans to be constructed that involve job search, education, and training.

Another description of career guidance places greater emphasis upon the individual, stressing the ability to find and keep a job, and the personal capacity to adapt to a changing labor market and new job requirements. Bridgstock (2009) suggests that generic skill development is an insufficient answer to the question of graduate employability so that universities should encourage broader career management skill in graduates so that graduates be able to proactively navigate the world of work and self-manage the career-building process.

According to Ajufo and Beatric (2013), the term career guidance is generally replacing the concept vocational guidance. Career guidance is focused upon the choice of occupation and is distinguished from educational guidance, which focuses upon the choice of courses of study. Career guidance brings the two together and stresses the interaction between learning and work. Career guidance has been identified as a key focus in addressing the mismatch between the needs of the labor market and the products of the educational and training system thereby dealing with unemployment and improving labor mobility.

2.3.4 Roles of career guidance in facilitating school to work transition

The period in which young people make the move from school to work can frequently be a challenging time for them. Career guidance can help to smooth the transition from school to work by providing young people with the required knowledge and abilities and by helping to support and broker their transition. There is evidence to suggest that providing support for transition can enhance young people's job satisfaction when they go to work. Career guidance is effective in assisting young people to successfully move in the labor market.

Evidence suggests that work experience and work-related learning are a significant component of career guidance programs in relation to labor market transitions. The research done by Blustein, et al (1997) recommends that family, educators and career counselors need to be active in supporting the school to work transition and in providing both practical and emotional support while in transition. We all agree that most parents are either illiterate or just do not have the information themselves so that institutions of higher education are appropriate partners in supporting the school to work transition since they allocate huge budgets in marketing in general and community outreach in particular.

According to European Training Foundation (2008) Study in Europe has recognized the following five factors that impact on the ability of young people to successfully transition from school to work. The economic, social and political context, education and training system, structure of the labor market, interfaces linking education with work, characteristics of the transition itself. Many of above factors are outside of the control of the schools and career guidance specialists who seek to positively influence the transitions of young people. The wide economic, social and political context and the structure of the labor market are not purely educational matters and need to be addressed through wider political and economic interventions.

Career guidance speaks about education and training system and the interfaces linking education with work and most importantly creates a significant link between them. Career guidance activities such as examining the world of work and seeing the real-world applications of academic subjects can be about engaging young people in education and increasing the relevance and applicability of their learning. Alongside these curriculum-embedded activities, career guidance also seeks to

smooth transitions into the labor market, for example, by explaining recruitment processes, aiding decision making and brokering relationships between young people and potential employers. Even if education institutes have an impact on young people's transitions into the labor market many young people are capable of making the transition from school to work without much support. The study was done by Canadian's Bell & O'Reilly (2008) which pursued to develop a framework for interventions to support the successful school to work transitions. The framework underlines the need to deliver young people with a good accepting of both the labor market and the various school to work transition pathways. The framework also emphasizes the significance of engaging stakeholders, including students, parents, teachers, and employers, and creating opportunities for discussion and information exchange. The study also pressures that career guidance programs need to be implanted in and connected to both the academic curriculum and other personal and social education activity in the school.

Technologically intervened career guidance compromises tools that can deliver young people with a window through which they can learn about college and work. Technologically intervened career guidance also provides communication tools that young people can use to build a link into their new environment. Greenburg (2004) recognized an essential role for portfolios in supporting both formal and informal lifelong learning. The electronic portfolios or student talent database refers to a collection of data showing students' study achievements and their continuing progress. The largest study of e-portfolios in schools was carried out by Barrett (2007) who found that the majority of students expressed assistances from the use of e-portfolios such as the ability to store their work, access to their work at home as well as at school, and new ways of presenting their work and demonstrating their progress to other people. They also reflected that e-portfolios allowed them to express their own individuality, choice, and creativity.

According to National Life Work Centre (2008) Technology-mediated career guidance can upkeep transition by providing students with both windows and bridges to the world of work and further learning. Windows empower students to test possible destinations and to mature approaches that will enable them to make an effective transition and adapt to the new environment. The approaches might take the form of occupational information, video case studies or simulations. Wang and Fan (2008) study that electro-portfolio assessment help in student's career development.

The study recommends that through analyzing and evaluating the data in the system, teachers can get a complete understanding of students' improvement and can guide and support them in accordance with their specific aptitudes and aspirations. There is also an indication of the value of electronic portfolios, also known as e-portfolios or career portfolios, in enhancing educational and career development.

Much of the current evidence on the value of e-portfolios is based on the higher education and adult setting. According to Sun (2009) When students are first enrolled in colleges, a dynamic database should be set up for each individual. Desmet, et al (2009) bring into being that college student who keeps an e-portfolio do better academically and have a higher overall retention rate than students who do not. The study was done by Tristram Hooley, et al (2011) examine studies done on the importance of electronic portfolios in facilitating school to work transition.

According to Ajufo and Beatrice (2013) school to work transition skills should be familiarized into the curricula of senior secondary school and tertiary institutions in the nation, specifically, for the final year students who are about to go into the competitive labor market. The training that helps to develop transition skills must create opportunities for providing experience with a view to encouraging and developing desirable work ethics and culture for national development. Youth should be skilled to own skills that are compatible with real labor market demands.

2.4 Career guidance approach in some countries

2.4.1 In southeast Asia

Singapore

The curriculum of career guidance in Singapore is divided into several main themes, including of Self-Awareness and Self-Management; Awareness of Relational Support and Decision Influencers; Exploring the Education Landscape and Planning Pathways; Career Sectors Exploration and deliver the career guidance approach in both of individual, group, and all students (Lapan, et al, 1997).

Education career guidance (ECG) in Singapore is a framework that guides students from primary to post-secondary school levels. The framework guides schools in coming up with developmentally span with three progressive phases: Career Awareness, Career Exploration and Career Planning (Lapan, et al, 1997). ECG lessons will provide students with opportunities to explore and investigate various industries, jobs, and possibly further education options and enable them to see the relevance of their studies and aspirations. This will improve learning motivation and engagement. In secondary school, the phase of career guidance and education is to extend students understanding of self and relate schooling to different education and career pathways. Students would explore the career world; understand the relevant courses of study; develop awareness of their skills, interests, and values.

Malaysia

The importance of career guidance can be evaluated from the fact that it was introduced in Malaysian schools as far back as 1939. In Malaysia, School career counselors playing an important role by preparing students to successfully transit to the next level, whether for further education or a job. The career guidance in Malaysia can be concise into four main points. These are the guidelines to be paid in the initial teacher training, the provision of guidance in primary schools, the provision of guidance through careers clubs that arranges debates, talks and searches for occupational information and finally, through encouraging self-employment (Lapan, et al, 1997).

Hong Kong

According to Feller RW (2003) and Ho YF (2008) Presently, in Hong Kong Career Guidance Services (CGS) Section of Education Bureau provides support to the schools and developed different assessment tools. In addition to the CGS, local mass media are keen on providing career information to the students and their parents near the release of public examination results.

2.4.2 In developed countries of the world

New Zealand

According to Nguyen and Loan (2016) Administration Guidelines provides career guidance and education for all students and particularly emphasized on providing specific career guidance for those students who have been identified as being at a risk for leaving school unprepared for further education/training or workplace. New Zealand, career education, and guidance emphasize the

need for students to develop career management competencies that include: Developing self-awareness, exploring opportunities and Taking appropriate actions.

America

According to Killeen, (1992) the Role of School Counselors in Middle and High School in the US, school counselors have the responsibility for providing counseling and guidance to the students regarding various aspects of academic and career-related problems or decisions. Regarding career guidance, school counselors are required to provide the basis for acquiring knowledge, attitudes, and skills that will enable the students to make successful transitions into the labor market as well as from job to job across their career in lifespan. In the middle school, six to eight school counselors help students in career development through self-assessment activities, comparing a middle school with high school and using assessment results. Students are expected to draw a relationship between interests and aptitudes and make a smart long-term career decision. Thus, school counseling programs play a pivotal role in preparing students to successfully transitions to the next level of education or joining the workforce.

2.4.3 Comparison of career guidance in Ethiopia and others

Like other countries, Ethiopia has not established the career guidance program in the educational system, with the direction from Government. Career guidance and counseling is a loosely applied perception in most educational institutions, governmental and non-governmental organizations.

The study conducts by Yilfashewa (2011) explain that in Ethiopia the nature of career guidance was weak. This is because the nature and quality of the career guidance services depend greatly on the guidance counselor training in career guidance, and creativity, resourcefulness, assertiveness and initiative; and on the moral and financial support provided by the educational institution administrator.

Guidance and counseling services in Ethiopian higher education institutions span two extremes: at one extreme is the majority, which provides only the minimum services in the form of the Career Orientation Week; while at the other extreme there are a few Ethiopian higher education institutions, for instance Addis Ababa University, has the best career guidance services offered to senior students before they graduate.

In Ethiopia Career guidance within Ethiopian higher education institutions (EHEIs) has historically given low priority and funding when compared to other curriculum areas. Often there is only one or no Careers Advisor in EHEIs who is tasked with delivering institution-wide and timely career guidance to all year levels. Career Advisor has moved from a classroom-teaching role into careers education with no specific training or background. However, the negative relationship between the output of graduates from EHEIs and absorption in workforce implies that the need for career guidance system. In Ethiopia, there has been a significant increase in educational attainment; however, there has not been as much job creation to provide employment opportunities to the newly educated job seekers because of skill mismatch and lack or improper function of career guidance. This is another implication for the need of career guidance system framework.

The study conducted by Abera and Gobena (2016) in madda walabu university suggested that career counseling services are seen to be highly recommendable in advancing students' career development in many aspects. Even though students' career choice, interest, and aptitude are essential factors influencing their success in universities and colleges, the Ethiopian tertiary education admission system is merely based on university entrance examination results and some affirmative action targeting girls, physically disabled students and students from 'developing' regions believed to be disadvantaged.

According to Sun and Yuen (2012), Gaps in access are particularly evident in career development and in the vocational tracks of college settings. There is generally a lack of career guidance provision for students in tertiary education despite the significant benefits of career development. The result of Abera and Gobena (2016) study showed career development was found to be important in understanding students' personal values, clarifying their goals, career choices and direction, and job-searching skills. However, the study reported that information on career guidance was poor. As a result, the students do not know where to obtain career-related information, subsequent in lack of future direction and decrease in performance. The career development services offered in the university were not enough and also not strong enough to

provide adequate information about the characteristics of different vocational fields, labor market information, and skills required by different vocational fields.

Career development services through traditional consultancy services from parents, elders, and peers may lead trainees to make irrational choices. However, scientific career development services should help to provide necessary information about the course of the study, information about the world of work, labor market information and relevant information about abilities and skills in terms of related qualifications and competencies required to take up the identified training program. Career development services are relevant in assisting trainees to identify job opportunities and job availabilities in the area of their studies and enable them to avoid wasting time in training for vocations to which they are unsuited. By contrast, the study revealed that career development service was not given adequately in the sample parent organization institutions. Therefore, the availability of the services is limited. As a result, this reality has adversely affected the training program as a whole.

The research done by Bimal (2014) identifies the absence of career advice, skill mismatch, Low career awareness levels among youth and lack of experience youth job seekers are some of the factors for unemployment in Ethiopia in addition to board economic factor. Using the intake capacity of higher education institutions as a major criterion can be a cause for some problems like unemployment of trained personnel. Considering Higher Educational Institutions (HEIs) are relevant partners in providing career guidance since they allocate huge budgets in marketing in and community outreach. The researcher of Abera and Gobena (2016) made the following recommendations: Career guidance and counselling services should be well established in order to reach all students, it should also focus more on creating career self-awareness, and it should adopt a strategy to improve career information and planning among students, moreover it should be strengthened if students' career awareness and career planning are to improve, and should focus on building a bright future for students, besides the Ministry of Education should give more training to career counsellors and provide adequate resources for their use in career guidance and counselling. However, the gap of this study was its scope limited to madda walabu university and it doesn't identify the ways in which the career guidance services should reach all student in the educational ecosystem in the whole country.

2.5. ICT and career guidance

2.5.1 Roles of ICT in providing career guidance

Career counseling services have helped noticeably from the arrival of new technologies but introducing information and communication technologies (ICT) to counseling was more of an accident process rather than a harmonized effort (Mihai 2012). ICT usage for delivery of career information and guidance covers a wide range of applications with key trend of increased accessibility, increased interactivity, and the more diffused origination of ICT-based resources. The growth of websites and helplines as forms of technically mediated service delivery means that the potential of ICT as a change agent is now greater than ever before (watts 2001). According to watts (1986,2001,2002), the role of ICT in career service area can be perceived in three means; as a tool, as an alternative, or as an agent of change. According to Barnes, la Gro and watts (2010) in career service area ICT used for the following four functions: informing, experiencing, constructing and communicating. Numerous developments have emerged at European level in the use of ICT in delivering counseling services. However, clients are slower in accessing web-based counseling. Funding seems to be the intermediating aspect of the adoption of ICT tools within the different counseling systems. The new technologies have presented quick and cost-effective solutions to a large array of problems, from data management to guidance in the transition from school to the labor market. Sharing and accessing information is no longer something practitioners dream to do, but an everyday reality where choosing the instruments is not about whether it can be done, but rather how to do it best. While there is little disagreement that career counseling services have benefited considerably from the use of new technologies, it seems that for the better part of the last two decades introducing ICT to counseling was a process that has lacked a planned and coordinated effort (Mihai 2012). While the factors that account for this situation are numerous and depend on the local context, it seems that the less counseling is perceived as generating economic benefits the less articulated the policy behind the use of ICT will be. Let us see some of the Good practices in the use of ICT in providing guidance and counseling in some developed countries.

2.5.2 Trends of ICT in providing career guidance in some developed countries

E-counselling

According to Dorotea (2007), E-Counselling is the ICT solution developed by Employment Service of Slovenia (ESS) for facilitating career guidance services. The aim of the project was to develop integrated e-information & counseling to upgrade existing level and possibilities for guidance and career counseling with free of charge, up to date and in full with web guidance information, tools, and interactivity between counselor and user in guidance. E-counselling was first of all designed for those who can use ICT for research and planning in their career and vocational development. The purpose of the web service E-counselling is to assure faster and simple entrance to guidance tools for identification on vocational (career) interest and to define employment and career aims. Users of the service better understand the influence of the personal characteristics of job preferences, recruitment and job satisfaction. E-counseling service offers tools for vocational and career self-assessment.

Virtual guidance

According to Mehtap (2011) Virtual Guidance Project developed by Turkish National Employment Agency with aims to increase the counselors' use of ICT in guidance services and to equip them with the competencies and skills they need to deliver such services. Virtual Guidance Project approached the use of ICT in guidance from the perspective of guidance practitioners and policymakers. It has definitely raised awareness towards the use of ICT in guidance and its benefits for various target groups. However, increasing guidance-related ICT skills of guidance practitioners is only a part of the work to be done in order to incorporate ICT in guidance.

eGOS: e-guidance and e-government services

According to Maria Chiara and Vita Finzi (2012) eGOS developed by Ministry of Education of Italy with aims at improving employability and guidance practitioners' capacity building through the activities of a prototype service that enables the delivery at a distance of educational and vocational e-guidance services, also to cross-border mobility. This eGOS system enables decision-makers in charge of educational, training and employment policies to reach also those citizens that, for different reasons, wouldn't be able to take benefit from traditional guidance services. In a long-term, the system will allow decision makers to reduce management costs and procedures of the services (i.e. less human resources needed, fewer clients to the traditional services, etc.). eGOS e-

guidance services are and will be accessible from final beneficiaries from the Internet on their home PC, from EG-kiosks placed in their living areas and from EG-stations within the tester partners' or any associated organization.

AIKOS: Open vocational information, counseling, and guidance system

According to Vaino (2012) AIKOS developed by Ministry of Education and Science of Lithuania with aims to assisting individuals to make educational, training and occupational choices and to manage their careers by ensuring access to relevant information, tools and opportunity to receive advice or further assistance from guidance counselors. The main AIKOS functions are to import and export data, process and systemize the data and to provide relevant information on learning skills on career planning, vocational information, and counseling.

e-Portfolio: Improve the situation in the labor market by reconstructing the career path

According to Elisabetta (2016), e-Portfolio is an ICT tool created by CIOFS / FP Piemonte, Italy for people and companies. The counselees can describe, narrate their work experiences using a simple and flexible ICT tool. They can choose to use e-Portfolio in a public or private way. Therefore, any information can be published or remain reserved for exclusive use. The program helps the counselees to become self-reliant with regard to information gathering (e.g. files, images, videos). It also supports job search by creating a job profile profitable in the labor market. Companies could search by specific criteria, then access to the counselee's pages and decide to contact them for a job interview.

2.6 Career guidance and cloud computing

In the era of technology, clients are more likely to seek counseling through the cloud computing and be more comfortable with this type of interaction. There is a paradigm shift in computing, from a situation where most of your data and applications were located on your computer, to a situation where most data and applications are delivered via the internet. So, we see a move from desk-based applications to cloud-based applications which provides a range of office-based applications and the capacity to store your data online. from the perspective of programmers and developers, cloud computing goes beyond providing a way to store data or access applications and opens up a new scalable environment within which development can take place. In the era of cloud computing, the way application and data delivered to the end users is changed and increasingly located off-site. Form organizations perspective, cloud computing has big implications for the

management of technical infrastructure. The locus of infrastructure moves away from a single organization towards the internet. For individuals, cloud computing opens up some possibilities that are prospective to have inferences for a career. The ability to create online spaces that can serve as repositories for data, to move data easily between learning and work environments, and to be able to share these resources with others, has the potential to mainstream the idea of the e-portfolio (Mihai 2012). According to Watts (2010) e-portfolio enabling individuals to share personalized learning content with both professionals and their peers in addition to own them. Nowadays E-portfolio tools are used strategically by a range of careers services to facilitate career learning so it is interesting to investigate ways in which use of reflective career learning processes can be extended beyond the formal educational contexts within which e-portfolios are usually introduced. E-portfolio within careers-service websites provide a way to create, organize and share materials in order support and smooth transitions and can provide ways to record and market individual and collective achievement. The cloud simply describes the location of materials that increasingly possible to “portfolio-is” learning and experience; the ability to use this location to selectively retain and broadcast key life, learning and work information across the course of a life journey has huge potential implications for career development.

2.7 Related works

There are different methods that help young peoples to develop self-understanding and vocational understanding. Computer Assisted Career Guidance (CACG) is one of these methods that allow a person to go through basic steps in career decision-making process using a computer. The services provided by CACG is similar to those normal given by counselors (Kasem and Akram 2014). The CACG system equipped with features essential for career choices, such as self-understanding test, career information database, and career planning tools. The basic premises of CACG system is matching career choice with individual characteristics such as interests, aspirations, and abilities (Murayama 2002).

Many developed countries have well-developed career guidance plans in their educational system from the school level. Career guidance, in its present form, owes its origin to the US and other developed countries as they realize its importance, see it as a key tool for personal development, and connect person and occupation based on their interest and aptitude of the individual

concerned. They use software packages like SIGI, SIGI PLUS, DISCOVER etc. to provide career guidance (Varalakshmi and Moly 2009). These facilities are not in use in Ethiopia and many developing country higher educational institutions. The proposed solution that is going to be developed should be based on some guidelines or some existing systems which are related to the proposed system. Hence the following related systems were studied and analyzed in order to get the concept of how to develop Cloud-Based Career Guidance System framework(CBCGS). For this purpose, five related systems were selected as follows.

2.7.1 Career in*sites system

According to Murayama (2002), career in*sites system developed with the goal to assist job seekers in developing their self-understanding through aptitude assessment tests and exploring the relationship between their aptitude and the characteristics of certain occupations. career in*sites system targets those in their early 20s to around 35 years of age who are first job seekers and those who are planning their first job change. The functionalities of the system are: assessment, compiling one's abilities and interests, occupational search and career planning. The assessment module contains four sub-areas for vocational assessment: ability, interest, values, and characteristics. After answering questions, the user can view his /her profile evaluating his /her characteristic in different categories. In the ability and interest sub area system generates list occupation matching the user's individual traits. Occupational search module contains job description so the user can read the description of the occupation and find out some statistical data of the separate occupation and information such as classification codes, required aptitude, number of people engaged, gender ratio, necessary qualifications and certificates and reference materials. Career planning module contains short-term and long-term career planning sections. short-term career planning test users' capability with their preferred occupations .in short-term career planning section user inputs the occupations he /she is personally interested in pursuing then the system indicates if the users' personally profiles from ability and interest match the required ability and interests of listed occupations. Besides after answering ability and interest questions the user can check his /her vocational readiness in four areas: self-understanding, vocational understanding, actual preparations and decision making.

The long-term career planning section presents the user with a list of possible major careers and personal goal between the 20s and 60s and asks the user to answer by what age he/she achieves each goal.

2.7.2 Discover system

According to Seeger (1988), DISCOVER is an occupational and educational information system which developed by JoAnn Harris-Bowlsbey in 1984. DISCOVER incorporates career guidance theory and job grouping schema to explain students about the world of work. The fundamental statement of DISCOVER is that as students better recognize themselves and the world of work, the process of matching similar occupations and educational programs will be easier and more effective. DISCOVER has four subdivisions. In Section one students identify their personalities such as learning about self, test their interests, values, and abilities, and produce suitable occupations to discover. Students obtain information that shows whether they like to work with data or ideas and people or things. Students can also rate themselves on their abilities plus compare themselves with their age group on the similar abilities. Occupations are then provided that is reflective of the person's main abilities. In section two, students have several ways to identify occupations based on personal characteristics. Students can also a choice and estimate a variety of occupational characteristics that are Significant to them such as employment outlook, Income, and work tasks, and produce a list of occupations which match with the student's assessments. In section three students can learn more about occupations .in the last section, students can look for educational Institutions that match their Interests, needs, and abilities. Users can find out about entrance requirements, fees and expenses, financial aid, and areas of study available.

2.7.3 SIGI-plus system

According to Seeger (1988), SIGI-PLUS was developed by Martin R. Katz at the Educational Testing Service in 1985. The system was designed to provide rooms for students at different stages in career decision making using the system for a variety of purposes. SING-PLUS has the following sections. The introduction section provides users with information for using the system, brief highlights of each section, and details on particular sections are described. In self-assessment section, students can value their current talents and attitudes concerning work. More specifically, a student can rate his or her own work-related values, choose interest fields desired in a career, and

evaluate activities one enjoys participating in and are good at. Search section identifies jobs a person might "like." Depending upon features specified by the student the SIGI-PLUS system generates a list of jobs that match the student's abilities and interest. A student with specific questions on an occupation can use the information section. Information section contains up to twenty-seven different pieces of information on any one of 300 occupations are available. Besides, two jobs can be compared at one time, if desired. Some examples of data available are skills, employment outlook, job titles, educational requirements, salaries, security, and where to find more information. In skills section, a student can see what particular skills are required for any occupation. Students can rate themselves on the skills required and compare different occupations according to skill requirements. Students can view educational or training paths necessary for any occupation in SIGI-PLUS. In section six on preparing. Also, students can guess their probabilities of completing the preparation path through assessing four Important preparation factors: finding the time, finding money, handling the difficulty, and staying motivated. The copying section offers advised solutions for students experiencing difficulties with school such as financing their education, arranging for child care, and evaluating their past education and/or work experience. This section also emphasizes on some Issues that are common to adult students returning to school (e.g., time management, fitting in, and competing in the classroom). The section deciding is a decision-making exercise, where students can compare up to three occupations at a time on selected measures such as rewards, perceived satisfaction, and chances of success to help them determine which occupation would be a good choice. In the final section, next steps students are provided with strategies for short-term career planning. A structure for setting goals such as getting more education or training, developing new skills, networking, and writing a resume is presented.

2.7.4 Career key web site

According to Jones (1987), Career key helps the users with career selections, career changes, career scheduling, job talents, and choosing a college major or educational program. It is based on the best science and practices of career consulting and the most complete and accurate information available. The Career Key test is one of the few professional-quality career tests on the Internet.

2.7.5 Career Guidance and Employment Management system(CGEMS)

According to Kasem and Akram (2014), a system designed with aims to help a user who is seeking for career guidance or looking for their opportune job. CGEMS helps various stakeholders such

student, job seeker, career advisor or consultant, and various company or organization can meet and help in one place. In order to assist the stakeholders to govern their best career choice, this system also offers some tests or quizzes that are related to such career and the user personality which will be useful for the career path. Furthermore, users of CGEMS such as company or organization can post a job description, when they look for an employee.

2.7.6 Comparison of proposed framework with existing career guidance system

The proposed cloud-based career guidance system (CBCGS) compared with existing career guidance systems as described in **Table 1** below. From existing systems which have been highlighted and analyzed, it is clear to find out that all these systems are good but none of them offer the integration and the combination of the services in order to help people to find what are looking for in one place. Moreover, the assessment section is based on culture in which career guidance practitioners exists so that it requires to improve assessment questions according to local culture and language for better understanding and its effectiveness. It is necessary to enhance these systems and avoid their limitation in the proposed system to be more useful. It is important to have a much more interactive, easy to use and user-friendly interface to be created that will focus on fulfilling system requirements and features that will be added and enhanced to the current system.

Table 1: Comparisons of existing career guidance systems with proposed system(CBCG)

Comparisons of existing career guidance systems with proposed system(CBCG)

Career guidance system	Application type	Features	Limitations	Assessment model used
CGEMS	Web-based	Job post, job search, career test and career planning	Limited scalability Poor quality of test	Not known
Career key	Website	Job search Career test	Limited scalability	Holland's RIASEC type
SIGI-PLUS SYSTEM	Web-based	Assessment, job search, career planning, decision making, coping	Assessment Questions are based only on western culture of work Limited scalability	Holland's RIASEC type
DISCOVER SYSTEM	Web-based	Assessment, occupational search, career planning, job match	Assessment Questions are based only on western culture of work Limited scalability	People/Things and Data/Ideas dimensions
CAREER IN*SITES SYSTEM	Web-based	assessment, compiling one's abilities and interests, occupational search and career planning.	Limited scalability Poor quality of test	Not known
CBCGS (proposed system)	Cloud-based	assessment, compiling one's abilities and interests, occupational search skills, labor market information and career planning.		Holland's RIASEC type

CHAPTER THREE

3. METHODOLOGY

3.1. Introduction

This chapter presents the methodology used in this study. It considers the use of Quantitative and qualitative methodology to investigate the processes and influences involved in students' career decision making at Ethiopia universities. Then the relevance of current careers education and guidance which students receive within the higher education sector is examined. In this chapter, the research design, process model used for prototype development, data source, sampling method, and participants, instruments used for data collection, a method of data analysis, prototype development, an overview of the framework is presented.

3.2. Research design

In this research Cross-sectional study was employed to gather quantitative and qualitative data through self-administered questionnaires and interviews. The survey items were administered to selected samples of respondents to gather information on variables of interest that lend themselves to quantitative and qualitative analysis. Since the aim of this research was to examine career counseling practices in universities of Ethiopia and the views of a variety stakeholders about their usefulness and effectiveness, the author of the study believed that a Cross-sectional study was the most appropriate.

3.3. Process model

In this research prototyping model was used since the domain area chosen for this research requires scalability and reliability features of the application being developed which benefited from the use of the prototyping sachem. Capturing and recording career guidance practices would use throughout universities in a big country like Ethiopia, with very diverse types of students from different nationalities and peoples with diverse culture and working habits, while introducing new concepts and semantic data related to the domain is not an easy task. This is due to mainly because the government and private organizations who are working on career guidance in Ethiopia do not have fixed set of guidelines. This characteristic of the domain needs flexibility in order to accommodate new concepts so that prototyping fit perfectly to the ever-changing scenario of the

domain mentioned above. The main reason for using prototyping model is that the lack of common and well-structured career guidance guidelines, lack of manual process and existing system to help determining requirements used for career guidance in Ethiopia universities is one of the launch pads for this research work. The following are details of process model:

3.3.1. Problem identification and motivation

This stage includes defining the knowledge of the state of the problem and the importance of its solution. The study began by defining the specific research problem and justify the value of a solution by conducting questioner and rigorous analysis of the literature on the importance of career guidance in the educational sector. Since based on the problem definition the author of the study atomizes the problem conceptually to capture its complexity for developing the proposed cloud computing framework that can effectively provide a solution. The value of the solution also motivating the author of the study and the audience of the research to pursue the solution and to accept the results and to understand the reasoning associated with the researcher's understanding of the problem.

3.3.2. Define the objectives for a solution

This stage aims to identify or drive the requirements for developing the proposed cloud computing framework from knowledge of the state of problems and current solutions. The author of this study infers the objectives of a solution from the problem definition and knowledge of what is possible and feasible to align with the career guidance requirements. The qualitative objectives are used, which described how a proposed framework is expected to support solutions to problems. The author of this study used the conceptual framework to inferred objectives rationally from the problem specification. In order to develop the study conceptual framework, the study has started with the literature review to gather relevant requirements and aspects of existing Cloud frameworks.

3.3.3. Framework design

This phase includes determining the framework's desired functionality and its architecture and then creating the actual artifact. The knowledge of theory that can be brought to bear in a solution is required to move from the objective of a solution to design and development of the proposed framework. Based on the required knowledge of a solution identified in phase one and two mention above and in addition with the literature review, comparison of career guidance theory and expert

questioner analysis proposed framework was developed by accomplishing following process: particular processes are selected, the type of deployment model is decided, strategies for storing data, the cloud vendor, and appropriate career guidance theory is selected. Finally, the proposed framework has been designed.

3.3.4. Evaluation

This phase aims to evaluate and measure how well the framework supports a solution to the problem by evaluating prototyping using questioner that collects feedback from students and career experts.

3.4. Data source

Both primary and secondary data source was used during data collection. Quantitative and qualitative data were collected from primary sources; students and career experts from selected universities. We have also used Secondary data source like previous researchers work on career guidance in Ethiopia and other countries, annual reports of Ministry of Labor and Social Affairs (MOLSA), world bank reports (WB) and the Ministry of Education (MOE). and publications on cloud computing paradigm and education, books, journal articles, and the like for specially to deal with the solution domain.

3.5. Sampling method and technique

The study defined study population at Addis Ababa, Samara and Hawasa higher education institutes. These organizations are selected based on following justifications. Addis Ababa University (AAU) selected because career guidance is in use so that there is a possibility to get experts and students with better domain knowledge. According to study done by Yilfashewa (2011), almost all universities of Ethiopia have no well-organized career guidance center of which Samara University(SU) and Hawasa universities(HU) were selected for evaluation of prototyping in order to examine career counseling practices in universities with no career guidance in use and the views of a variety of stakeholders about usefulness and effectiveness of career guidance in higher education sectors. Once the target population was defined, the next task performed was taking representative samples. The researcher used judgment or Purposive sampling techniques of non-probability sampling methods. judgment or Purposive sampling technique was applied to get qualitative data from 149 respondents; 29 career experts from Addis Ababa university main campus and 120 final year students from HU, SU, and AAU six kilo branch. All of the currently

active career experts from Addis Ababa university main campus were participants on the questioner for this study of which 16 are from the department of philosophy and 13 are from the department of psychology.

3.6. Data collection instruments

3.6.1. Questionnaire

Questionnaires were used to obtain information. Quantitative data was collected through targeted questionnaires administered to each group of stakeholders (i.e. student and career experts). Questionnaire items can be presented as either close-ended questions or open-ended questions. In this research, the questionnaires comprised both open-ended and close-ended questions. The main investigation themes include academic choice motivation, students' abilities and competencies, interests and values, factors influencing the career choice, decisional style, academic and professional experience, career decision information sources and students' future intentions and objectives. Questionnaire items for career experts contained 17 items; those for students had 14 items. Questionnaire items for students were used while conducting the prototype evaluation sessions. This is done by preparing questions that are believed to be representative in evaluating a particular cloud-based career guidance system framework. Questioners were given to 120 students selected by using judgment or Purposive sampling techniques of non-probability sampling methods from samara university, Hawassa university, and Addis Ababa university six-kilo branch. 40 students are selected by using judgment or Purposive sampling techniques of non-probability sampling methods from each university. Quantitative feedback data was retrieved from the prototype evaluation session. Details pertaining to the evaluation questions and the analysis results can be found in the data results and analysis chapter five.

3.6.2. Interview

Although questionnaires are consuming less time and economy, they have limitations. One of the major limitations is that they do not always produce answers that reflect distinction and complexity. It is difficult to get a deeper understanding of respondents' thinking and feelings. It was partly in order to overcome these and similar other limitations of questionnaires that interview

questions were included in the study. Even more importantly, the interviews were found to be important in the light of the nature of the research questions, most of which aim at the views and perspectives of respondents about matters such as the usefulness and effectiveness of career guidance at universities level. Six career experts four from department of philosophy and two from department psychology of AAU main campus were interviewed. Interview questions for career experts focused on the cost of set up and administration of career counseling programs and alternative mean to minimize the cost of using career guidance service in all Ethiopia educational institutions and particular in universities. Details pertaining to the interview questions and the analysis results can be found in the next chapter.

3.7. Method of data analysis

This research aimed to answer two research questions that the foremost question enables to know the problem area and the latter one for the solution stack. Data were organized, analyzed and summarized for a better understanding of the current ICT capability, structure, and usage. To analyze quantitative data collected through questionnaire items, Percentages and frequencies were calculated using SPSS 2.2. The study sought to assess the usefulness and effectiveness of career guidance and counseling services in universities as viewed by career expert clients and other stakeholders. Hence information from quantitative data collected through questionnaire questions used to explore all the research questions and grouped to identify statements that highlight and explain similarities or divergence of views between participants/respondents. Literatur on the concepts of cloud computing and related studies on career guidance was reviewed.

Accordingly, questioner and review of the relevant literature are employed to develop the knowledge bases required for developing the proposed cloud computing framework.

3.8. The development of the prototype

To implement the prototype of the proposed framework the study have used different technologies and architectural models listed below.

3.8.1. ASP.Net

ASP.net is the programming language that is used to build the prototyping. The ASP.net platform 2010 version defines a sample standard that applies to all aspects of architecting, developing, deploying and managing multi-tier server-based application. The ASP.net language was selected because it is supported by Aneka and moreover it is easy to develop application since it is easy to design application using its graphics controls.

3.8.2. Aneka

To implement the cloud infrastructure Aneka 3.1 “a cloud operating system that controls large pools of computing, storage, and networking resources throughout a datacenter” will use. In other words, Aneka is a platform for deploying Clouds and developing applications that provide a runtime environment and a set of APIs that allow developers to build .NET applications that leverage their computation on either public or private clouds. One of the key features of Aneka is the ability to support multiple programming models that are ways of expressing the execution logic of applications by using specific abstractions. This is accomplished by creating a customizable and extensible service-oriented runtime environment represented by a collection of software containers connected together.

3.9. Issues of reliability and validity

Questioner questions were organized in the way helps to answer the research question and respondents who have better domain knowledge were chosen for a questioner. The result was organized in a structured form and compared with another researchers result. Readily available literature was carefully selected from the authenticated sources. The Scientific research method was applied to the interpretation and explanation of findings. Finally, the proposed framework has evaluated by developing the prototype and the reaction of career experts to test its' validity and acceptability.

CHAPTER FOUR

4. RESULTS

4.1. Socio-demographic characteristics

Data were collected from 120 graduating class (GC students) of Addis Ababa, Samara and Hawassa universities and 29 career experts to evaluate the prototyping. **Table 2** describes the general information of the career expert respondents based on their socio-demographic characteristics. The total number of participants in the study was 29. As indicated, 26 (89.7%) of the participants were male, whereas the rest 3(10.3 %) were female. The table below shows that majority 12 (41.4%) of the career experts were between the age of 35-39 years. On the other hand, 11 (37.9 %) of them were in the age range of 40 and above.

Concerning marital status, a large number of the respondents were married 24(82.8%) while 5(17.2%) were not married. In terms of educational status, participants with educational qualification of Masters (MSC) accounted for the for more than fifty percent 17(58.6%) while 41.4% Ph.D. holders. Regarding work experience as career guidance, a large number of the respondents 20(69.0 %) had work experience of 4 years and above while participants with the work experience of 3 years and below were accounted for 31.0%.

Table 2: Socio-demographic variables of career expert from AAU, 2017

Variables		N=29	%
Gender	Male	26	89.7
	Female	3	10.3
Age	30-34	6	20.7
	35-39	12	41.4
	>=40	11	37.9
Religion	Orthodox	9	31.0
	Protestant	14	48.3
	Catholic	6	20.7
Marital status	Married	24	82.8
	Single	5	17.2
Education status	Masters (MSC)	17	58.6
	PHD	12	41.4
Work Experience as career guidance	<=3	9	31.0
	>=4	20	69.0

Table 3 shows that a total of 120 students were included in the study. As indicated below, 63(52.5%) of the participants were male, whereas the rest 57 (47.5 %) were female. The table below also shows that more than sixty percent (77) of the study participants were between the age of 20–24 years. On the other hand, 43 (35.8 %) of them were in the age range of 25 and above. In relation to admission type, all students are regular students. Moreover, in terms of academic year level, Year IV participants accounted for the majority of the participants with 63(52.5%) while Year VI respondents totaled 57 (47.5%).

Table 3: Socio-demographic variables of students from AAU, SU and HU, 2017

Variable		N=120	%
Gender	Male	63	52.5
	Female	57	47.5
Age	20-24	77	64.2
	>=25	43	35.8
Academic year	IV	63	52.5
	VI	57	47.5
Admission type	Regular	120	100
	Extension		

4.2. Presentation of the Interview Result

4.2.1. Cost to open career guidance centers in all Ethiopia educational institutions

Table 4 : Cost to open career guidance centers

Do you think that it is cost to have career guidance centers in all HEIs to expand career guidance access?	Number of "Yes"	Number of "No"
	4	2

The question asked to get the reaction of the respondent about the cost to set up and administration of career counseling programs. As shown in **Table 4** above the majority of the respondent agreed that it is too expensive to have career guidance centers in each EHEI because the service of career guidance need enough career experts which was currently not available since lack of career experts in the field of counselling identified as one of challenge hardly affect role to improve the career counselling service in EHEIs(Yilfashewa,2011).

4.2.2. Need of integrated service delivery

Table 5 :need of integrated system to elasticity career guidance service in all HEIs

Number of “Yes”	6
Number of “no”	0

The question asked about the need of an integrated system that helps to give career guidance service in all universities and all 6 of the career experts say “Yes. This need of integrating career guidance service clearly shows that a single university cannot afford sufficient career guidance access channel to all who needs career guidance there for we need to have one national career guidance center service provider at MOE level that will be shared by all EHEIs.

4.3. Presentation of the questioner Result

4.3.1. The processes and influences involved in students’ career decision making

As shown in **Table 6** below, career experts agreed that careers advisors have strong influences on students’ career decision. In addition, it was also showed that parents, peers, classroom teachers and mass media have some influences on care decision. On the other hand, its majority of the study participants agreed that church and sports coach have no influences on students’ career decision-making process.

Table 6: Influences on career decision making from the Career Advisors

Items	No influence		Some influence		A large amount of influence	
	N	%	N	%	N	%
Parents /Family	5	17.2	22	75.9	2	6.9
Friends/Peers	3	10.3	33	79.4	3	10.3
Classroom Teachers	1	3.4	24	82.8	4	13.8
Careers Advisor	-	-	7	24.1	22	75.9
Dean/department head	4	13.8	18	62.1	7	24.1
Media/TV/Magazines	12	41.4	16	55.2	1	3.4
Sports Coach	25	86.2	4	13.8	-	-
Church Leader	26	89.7	3	10.3	-	-

Influences on career decision making from the Career Advisors

Table 7 below describes Status of career guidance and measures are taken to improve service. As shown in table most of the career experts 20(69.0%) agree that status of career guidance is poor. Although the status of the career guidance service is poor, career experts agree that there is no advanced measure taken 18(62.1%) to improve career guidance service.

Table 7: Status of career guidance and measures taken to improve service

Item	Poor		Good	
Status of Career guidance being provided	N	%	N	%
	20	69.0	9	31.0
Measures were taken to improve service				
Creating career self-awareness	7		24.1	
No measure was taken yet	18		62.1	
Workshops (trainings)	4		13.8	

Consultation

Careers Advisors were asked whether students should be consulted about what they require from careers education and guidance and more than half (55.2%) of career experts reported that students should be consulted.

4.3.2. Students' information on career guidance and education

Table 8 reveals that students have a different level of information on career guidance and education. Accordingly, about 83% of career experts reported that students have no adequate information, whereas about 72% reported that students do not know where to secure the information. Even though students have some information on career guidance and education (17.2%), almost all of career experts (96.6%) do not see a bright future ahead. This, in turn, results in the creation of worrying for fresh graduates about what to do and how to get employed after graduation (72.8%). In short, the result shows that the information that the students of the high educational institution have in relation to career guidance and education is not satisfactory. There are two main reasons for this situation. First, students are uninformed about the existence of the Career Center because there is no career center in most universities, and second – they have no idea about their activity in the University, nor about the services offered.

Table 8: Students' information on career guidance and education

Item	Yes		No	
Have adequate information	N	%	N	%
	5	17.2	24	82.8
Why not sufficient				
Lack of adequate expert	18	62.1	11	37.9
Do not know where to secure this information	21	72.4	8	27.6
Career guidance service was not in use currently at all higher education institutions	15	51.7	14	48.3
Graduate and this worries you greatly	21	72.4	8	37.9
Do not see a bright future ahead of you	1	3.4	28	96.6

4.3.3. Importance of career guidance and education services for the students

Table 9: The importance of career guidance and education services for the students

Items	Agree		Disagree		Not sure	
	N	%	N	%	N	%
Helping students to understand their personal values	26	89.7	-	-	3	10.3
Helping Students to clarify their career Goals	20	69.0	-	-	9	31.0
Helping students in choice their career direction	24	82.8	-	-	5	17.2
Assessing students' skills and Abilities	25	86.2	-	-	4	13.8
Locating career information for the students	21	72.4	-	-	8	27.6
Helping students' in job-searching techniques	20	69.0	2	6.9	7	24.1
Developing students' interview skills	3	10.3	22	75.9	4	13.8
Developing decision-making skills	20	69.0	3	10.3	6	20.7
Identifying obstacles to students' career choice	4	13.8	12	41.4	13	44.8
Helping in writing résumé	2	6.9	14	48.3	13	44.8

Table 9 above clearly illustrates that most respondents agreed with the benefits of a guidance and education service for career development. Accordingly, the respondents pointed out that career guidance would help students to understand their personal values (89.7%), assess their skills and abilities (86.2%), choose the right career (82.8%), locate career information (72.4), clarify their career goals (69.0%), develop their job-searching techniques (69.0%) and developing decision-making skills (69.0%). In contrast, relatively few career experts did not agree on the importance of career guidance and education service in identifying obstacles, writing a résumé and developing students' interview skills. Therefore, the majority of high educational institution career experts believe in the importance of a career guidance and education service for students' career development.

4.3.4. Helpfulness of career guidance and education when it included into university curriculum and effective means (intervention) to include it

Table 10: Helpfulness of career guidance and education as part of curriculum

Item	Yes		No	
Helpful as a part of the curriculum	N	%	N	%
	22	75.9	7	24.1
Means to include the curriculum	N		%	
Computer-assisted self-awareness per week	16		55.1	
As course	3		10.3	
As lesson at end of each session	3		10.3	

As shown in **table 10** above most of the career experts 22 (75.9%) agree that career guidance and education is helpful if it is included in universities curriculum. The career experts agree that career guidance service is fruitful if computer-based self-awareness is provided on a weekly basis.

4.4. System evaluation

Table 11 below shows user responses gathered via questionnaires. The number of responses and frequency evaluation grade for each question is indicated. Q1 to Q4 are for evaluating the helpfulness and reliability of the aptitude assessment function. The result of the study reveals that 90(75%) students agreed on the importance of the system in helping them to understand their own personal ability and value, 84(70%) agree on type of work system suggested to meet students personal image, 82(68.3%) agree type of work suit and 80(66.7) agree aptitude rating supplied by system conform with their self-image. Q5 and Q6 evaluate post-assessment future career plans suggested by the system, and a satisfactory result was obtained from these questions. This indicates that system is adequate in this area. Q7 to Q10 evaluate overall effectiveness and whether the system was interesting, and high level of interest was examined among the students to use the system. Therefore, it can be confirmed that young Ethiopian university students found using Cloud-based career guidance and education system an interesting experience.

Table 11: overall system evaluation

Question	Yes		No	
	N	%	N	%
1. Has the system helped you understanding your own ability and interest?	90	75	30	25
2. Does the aptitude rating supplied by system conform with your own self-image?	80	66.7	40	33.3
3. Has the system helped you understanding what type of work suit you?	82	68.3	38	31.7
4. Does the type of work system selected for you meet your image?	84	70	36	30
5. Has the system helped clarify what work you should pursue?	74	61.7	36	38.3
6. Has the system helped you understanding the next step you must take to find job?	70	58.3	50	41.7
7. Was the system interesting to use?	87	72.5	33	27.5
8. Was the system easy to use?	85	70.8	35	29.2
9. Do you want to use system again?	82	68.3	38	31.7
10. Is the system useful in selecting future occupations?	74	61.7	36	38.3

CHAPTER FIVE

5. CLOUD-BASED CAREER GUIDANCE (CBCG) FRAMEWORK AND PROTOTYPE DEVELOPMENT

5.1. Background of CBCG framework

cloud computing can refer to numerous different service types (SaaS, PaaS, and IaaS) and different deployment models (private, public, community, and hybrid cloud). Each service type or deployment model has its own benefits and risks. Thus, the key attentions in contracting for different types of services or deployment models should be different. In this chapter, the study focuses on identification of service and deployment models that are best for career guidance in the cloud.

5.1.1. Cloud services selection

It is blameless for organizations to wisely considering their IT portfolios and developing a roadmap for deployment and migration to the cloud computing. These roadmaps prioritize services that have high anticipated value and high readiness to maximize benefits received and minimizes delivery risk. Outlining exactly which cloud services an organization expects to provide or consume is a fundamental initiation phase activity in developing an agency roadmap. The cloud-based services were selected and identified by considering the needs of storage, integrated system update cost, scalability cost and the cost required for training career advisors to improve and expand the access of the career guidance service in all educational institutions of Ethiopia to their uses in the cloud environment for CBCG. The following sections discuss the three types of cloud services among which platform as service offered for this study due to its important characteristics as shown in **Figure 1**.

A. Software as a Service (SaaS)

SaaS enables users to access applications running on a Cloud infrastructure from various end-user devices (generally through a web browser). The user does not manage or control the underlying Cloud Infrastructure or individual application capabilities other than limited user-specific application settings. In SaaS users can access Career guidance system from the cloud.

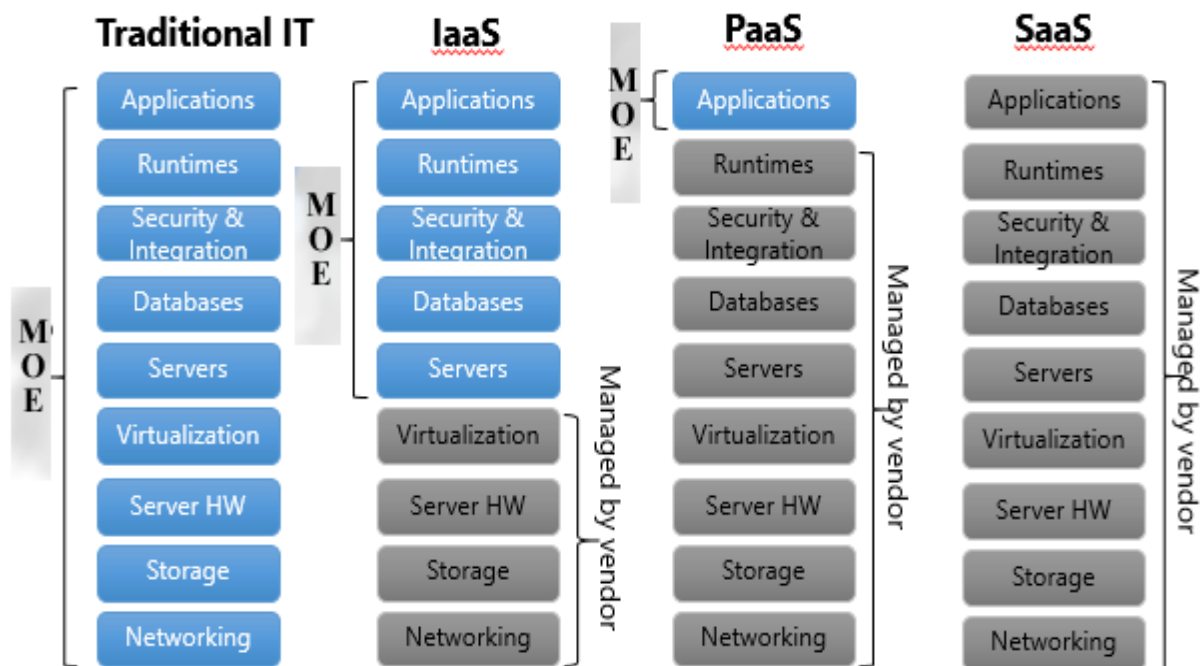
B. Platform as a Service (PaaS)

With Platform as a Service, the cloud provider hosts applications developed by the user, or on behalf of the user, using the cloud provider's operating system. In other words, the service provider offers a software platform and protocol stack on which a customer's career guidance application can run. For example, a career guidance application could be managed in the cloud utilizing a SQL or Oracle database instance offered by the PaaS provider. In PaaS service model user have full control over application and data so that the application manager or administrator can modify application accordingly when user requirements changed. In PaaS, service model user can develop an application using different Solution Stacks such as Java, PHP, ASP.NET, and Storage such as Databases and File Storage.

C. Infrastructure as a Service (IaaS)

In this service model, the provider owns the equipment and is responsible for housing, running, and maintaining it, therefore, the cloud user contracts out the equipment used to support operations, including storage, hardware, servers, and networking components. The user typically pays on a per-user basis. The benefits of IaaS include rapid provisioning, ability to scale and pay only for what you use.

Figure 1 Comparison of service models based on user control over resources



5.1.2. Selecting cloud service provider

Selecting a proper cloud provider is the most significant portion of the implementation plan. Different providers may suggest different service models, pricing schemes, audit procedures, and privacy and security policies. Education providers have to compare different offerings and evaluate the provider's status and performance before it signs a contract. The following sections discuss the different types of cloud services providers by emphasizing properties that are likely to affect the decision to move the application to the cloud. For example, describe supported languages and frameworks, runtime environment restrictions, the platform provided services and features, and pricing models. Accordingly, Microsoft Windows Azure offered for this study due to the important characteristics that it provides possibilities to develop applications in different programming languages and architecture and enable deployment of these applications on operating systems of organization choice. Windows Azure provides both platform-as-a-service (*PaaS*) and infrastructure-as-a-service (*IaaS*) models and supports many different programming languages (C#, C++, Java, JavaScript, Python, ...), tools (Visual Studio, Git, Eclipse, Command Line...) and frameworks (.NET, Node.js, ...), as well as different operating systems (Windows Server, Ubuntu, Open Logic, SUSE, ...) for virtual machines. There are several motives to choose Windows **Azure** instead of a classical web hosting. One motive is definitely the covering distribution of the data centers. The CDN nodes are currently located in 24 countries. Most of the providers support different flavors of both Windows and Linux based environments and almost all of the providers (except Google App Engine) offer deployment options for both 32 and 64-bit architectures. It can be seen that Java, Python, and Ruby have been the dominant languages for development of applications and supported by most of the platforms as discussed in **Table 12** below.

Table 12: comparison of features provided by major PaaS cloud computing providers (Islam and Rheman 2013: p .6)

	Google App Engine	Microsoft Windows Azure	Citrix	Salesforce.com
Virtualization	Application container	Microsoft CLR VM	Xen Server	n/a
Pricing model	Pay-as-you-go	Pay-as-you-go, then subscription	Subscription	Pay-as-you-go
Major products / services	Computation, Cloud SQL Database, Google cloud storage	Web server, Big Data, SQL Azure storage etc.	Public and private cloud, DHCP, load balancing, IP addresses	Sales cloud, service cloud, marketing cloud
Access Interface	API	Web-based, API, console	Web-based	Web-based, API
Security Features				
Preventive Measures	X	Basic	Basic	Moderate
Reactive Measures	X	Basic	Basic	Basic
Reliability	Inadequate	Inadequate	Poor	Good
Availability (%)	99.9	99.9	99.9	99.9
Scalability	Good	Basic	Basic	Good
Support different operating system, programing language	Basic	Good	Good	Basic
Tools / Frameworks	Django, Pylons, CherryPy, web2spy, Java, Python	Java, PHP, Python, Basic	X	Java, PHP, Ruby

5.1.3. Selecting deployment model

Clouds are generally deployed using Public, Private or Hybrid models depending upon the requirements of the user. In this section, the cloud computing architecture has been assessed, focusing on the various features of the Public, Private and Hybrid cloud models relevant to most individuals and organizations and how they support or hinder the operation of various cloud computing models. There are many parameters which are of concern when we compare the different types of cloud deployment models. Generally, according to Kaur (2016) for small organizations that seek cost savings and test their software products before they are out in the market, using public clouds is a good option. Private clouds are better suited for organizations that handle sensitive data and are apprehensive about its confidentiality. For organizations which want to gain the benefits of both security as well as cost-effectiveness, hybrid clouds are appropriate. Depending on the organization's priorities and needs, a particular cloud infrastructure can be

chosen. The comparison has been shown in **Table 13**, based on some parameters which are of relevance to most of the SMEs and large organizations as well as individual users. The hybrid cloud model is a pragmatic solution for most of the issues of the enterprises and individuals. Accordingly, Hybrid cloud model offered for this study due to its important characteristics as discussed in **Table 13** below. Therefore, sensitive university data such as financial account number, home address, phone number of individuals in protected class, student university records, credit card information, etc. should be deployed on private section of hybrid cloud and information concerns labor market and career guidance system should be deployed on public part.

Table 13: Comparison of Public, Private and Hybrid cloud (Kaur 2016: p. 3)

Characteristic	Public Cloud	Private Cloud	Hybrid Cloud
Scalability	Very high	Limited	Very high, burstable
Security	Low; depends on encryption techniques used by service providers	High	Moderate
Performance	Low to medium	Very good	Good
Reliability	Medium, it depends on the service provider availability and connection to the internet	High, as many of the equipment is within the organization	Medium to high, as the replicated content is kept within enterprises
Cost of use	Pay-as-you-use	The high cost of initial set up	Pay-as-you-use
Data & Application Integration	Easy	Easy	Difficult due to change in cloud platforms
System Management	Easier as compared to hybrid cloud	Easier as compared to hybrid cloud	Difficult as compared to public and private cloud
Portability	Easy	Easy	Difficult
Tooling & Skills	Easy	Moderate	Difficult, as it's relatively a new idea
Data Security Solutions	Better encryption techniques, authentication of the user by the provider	Encryption of data on private servers	Encryption of personal data, Sensitive data should not be stored in public cloud
Accountability Solutions	Moderate chances of privacy violation	Fewer chances of privacy violation	Audit needed for each step, Data loss, leakage or privacy violation may be dangerous
Data Handling	All the data is on a public platform	All the data is on a private platform	Confidential data is stored on private servers to respect country-specific laws
Workload	Normal workload with short-term spikes in demand	Mission-critical workload with security concerns or management demands	Highly dynamic or changeable
Capital Expense	Low	High	Reduced, as the increase in demand is outsourced to a public cloud
Network Requirements	Works on internet	Works on organization's intranet	Needs to move from intranet to internet

5.1.4. Select toolkit/framework for simulate cloud computing

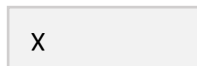
There are different frameworks for simulating cloud computing among which Aneka was offered for this study due to its important characteristics as discussed in **Table 14** below. One of the key features of Aneka is its capability to support multiple programming models that are ways of communicating the execution logic of applications by using specific abstractions. This is skillful by creating a customizable and extensible service-oriented runtime environment represented by a collection of software containers connected together.

Table 14: Comparison of Open-Source Cloud Management Platforms (Xiao long, et al. 2012: pp.4-5)

Factors	OpenStack	Open Nebula	Aneka
Cloud Types	Private and public cloud	Private, public and hybrid Cloud	Private and public cloud
Supported OS	Most Linux Distributions	Most Linux Distributions	Windows, Linux, MacOS X
Programming Language	Python	Java and Ruby	C#, C++, VB,
Compatibility with public cloud	Amazon EC2, S3	Amazon EC2	Amazon EC2, window azure
Commercial Model	Free	Free	Free
Used by	Large commercial Enterprises	research institutes, universities and public institutions	engineering, health, universities and public institutions
Main Purpose	Build private and public Clouds	Provide cloud computing services and resources management	Build private and public Clouds
User access interface	Command line	Command line, Web APIs	Web APIs, Custom GUI

5.2.1. Selection of career development theory

No acknowledgment



Significant emphasis



Acknowledgment

Table 15: Comparison of career guidance theories by influences of personal characters on career guidance (McMahon and Patton ,2014)

Content influences	Trait and factor theory	Five-factor models theory	Hollands Theory	Theory of work adjustment
Intrapersonal System				
Ability		X	X	
Aptitudes		X	X	
Interests		X		
Gender		X		
Age		X		X
Skills		X		
Ethnicity				
Beliefs	X	X	X	X
Disability		X	X	X
Values		X		
world of work knowledge		X		
Personality				
self-concept		X		
physical attributes		X	X	X
Social System				
Family		X		X
Peers		X	X	X
community groups	X	X	X	X
education institutions		X		X
Media	X	X	X	X
Workplace		X		
Environmental-Societal System				
political decisions	X	X	X	X
historical trends	X	X	X	X
employment market		X	X	X
geographical location		X	X	X
socioeconomic status		X		
Globalization	X	X	X	
Process influences				
Recursiveness	X	X		
Change Over Time	X	X		
Chance	X	X		X

There is no single theory that comprehensive enough to account for the complexities of human behavior, especially when the range of client types and their specific problems are taken into consideration. According to trait and factor theory, choosing an occupation involves trying to match an individual to a job so that their needs will be met and their job performance will be satisfactory. The term ‘trait and factor’ implies a matching between individuals and jobs, and career selection occurs as a result of understanding the relationship between knowledge about self

and knowledge about occupations (McMahon and Patton ,2014). The limitation of trait and factor theory is career choice is viewed as a single, static, point in time event where there is a single right answer, limited attention it pays to contextual factors such as social influences and processes such as work adjustment, and failure to account for growth and change in traits such as interests, values, aptitudes, achievements, and personalities. These criticisms have become even more relevant in the world of work of the twenty-first century where it is predicted that individuals will engage in career decisions about learning and work several times in their lifetime and that they will change jobs several times during their working lives.

Five-Factor Model of Personality also known as the Big 5 is a hierarchical organization of personality traits in terms of five basic dimensions: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. Conscientiousness: achievement-oriented, organized, thoughtful, planful, responsible, hardworking, thorough; Neuroticism: anxious, insecure, defensive, tense, worried; Extraversion: active, assertive, energetic, enthusiastic, outgoing, talkative; Agreeableness: cooperative, likeable, forgiving, kind, sympathetic, trusting; Openness to experience: intelligent, unconventional, imaginative, curious, creative, original. Indeed, unlike trait theory, five-factor theory depicts a dynamic personality operating system that takes account of self-concept, cultural adaptations, external influences and emotional reactions (McMahon and Patton ,2014). Despite shortcomings which include limited consensus on the nature of the factors, and limited prediction and explanation capabilities, the five-factor model typifies the trait and factor models. It is static in nature, relies on the measurement of individual differences, and does not describe the process of development. In their application, they rely heavily on the measurement of individual traits and matching processes.

In Person-Environment Fit (P-E fit) theory there are two alternatives for career choice the first one is Complementary fit which applies when a worker and an organization offer what each other needs and the second is Supplementary fit which applies when a worker and an organization have similar characteristics. The P-E fit model provides a valid and useful way of thinking about the interaction between the individual and the environment (McMahon and Patton ,2014). The limitation of the P-E fit theory is that interest for 21st-century career development practitioners is the notion that best fit may not always be possible for clients who may need to consider a good

enough fit or acceptable fit depending on their circumstances. As circumstances and individual's perceptions of their environments change, so too may their perceptions of 'good enough fit'. Since this study offers Holland's theory because of the following justifications.

Holland's theory provides a parallel way of describing people and environments by classifying them according to six types(RIASEC). Interrelationships between the types provide a means of predicting the career choices of individuals, how easy it will be for them to choose, how satisfied they will be with their career, and how well they will perform.

In Holland's culture, most persons can be categorized as one of six types: Realistic, Investigative, Artistic, Social, Enterprising, or Conventional. There are six model environments: Realistic, Investigative, Artistic, Social, Enterprising, or Conventional. People search for environments that will let them exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles. Behavior is determined by an interaction between personality and environment (McMahon and Patton ,2014). Holland's did explain that individuals develop preferences for certain activities as a result of their interaction with cultural and personal forces including peers, biological heredity, parents, social class, culture, and the physical environment and that these preferences become interests in which individuals develop competencies. As a result of his/her interests and competencies, an individual develops a personal disposition that leads him or her to think, perceive, and act in special ways. Personality types are therefore indicated by choice of school subjects, hobbies, leisure activities and work, and vocational interests and choices are reflected personality. In choosing or avoiding certain environments or activities, types are seen to be active rather than passive.

Holland claimed that individuals seek out work environments which are compatible with their attitudes and values and allow them to use their skills and abilities, a corollary of which is that people in similar jobs will have similar personalities. Therefor the processes modules in cloud subsystem of CBCGS in **Figure 4** was developed based on the integral idea of all theories and more specifically Holland's theory.

5.2. Overview of cloud-based career guidance framework

The CBCG framework is designed based on the architecture shown in **Figure 2** below.

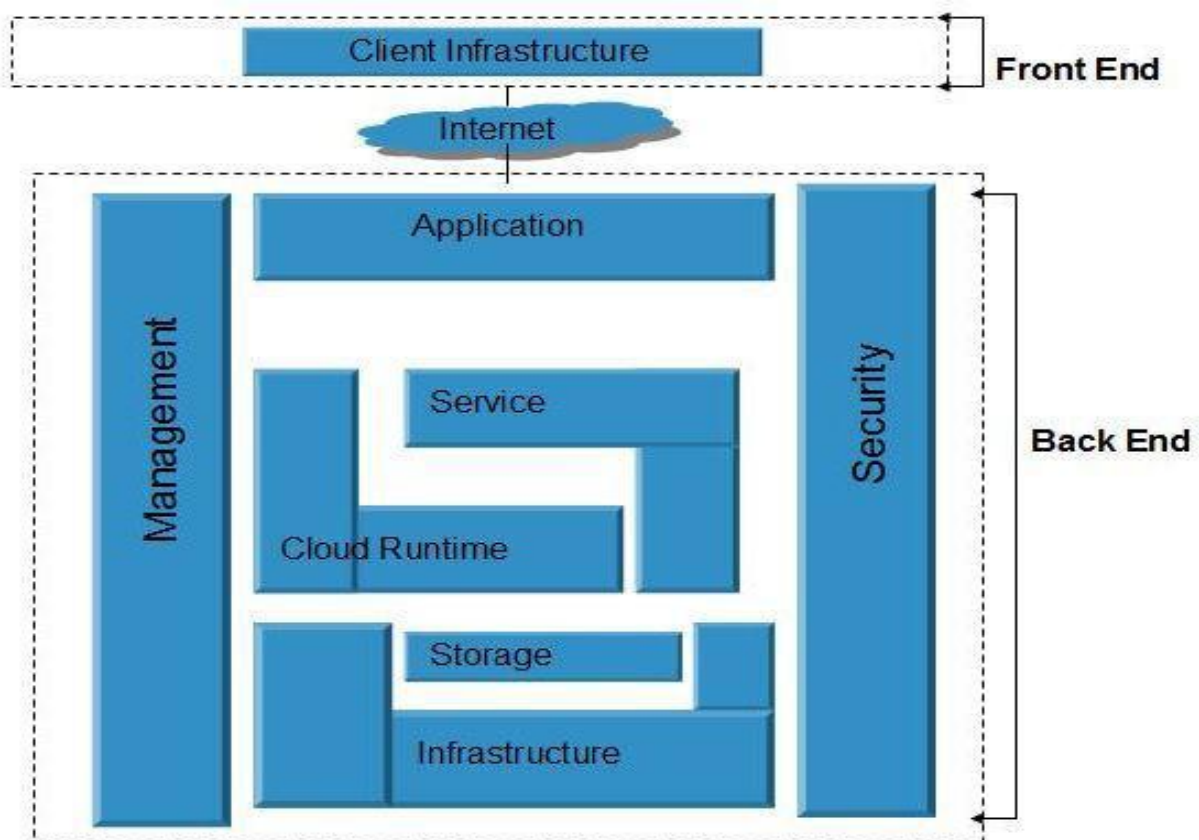
Front-end

Front End is client part of cloud computing system that consists of interfaces and applications that are required to access the cloud computing platforms. For instance, Web Browser.

Backend

Back End is cloud part that consists of all the resources required to provide cloud computing services. It comprises virtual machines, servers, huge data storage, security mechanism, services, deployment models, etc. cloud subsystem is answerable for providing built-in security mechanism, traffic control, and protocols. The server employs confident protocols, called middleware, which helps the connected devices to communicate with each other.

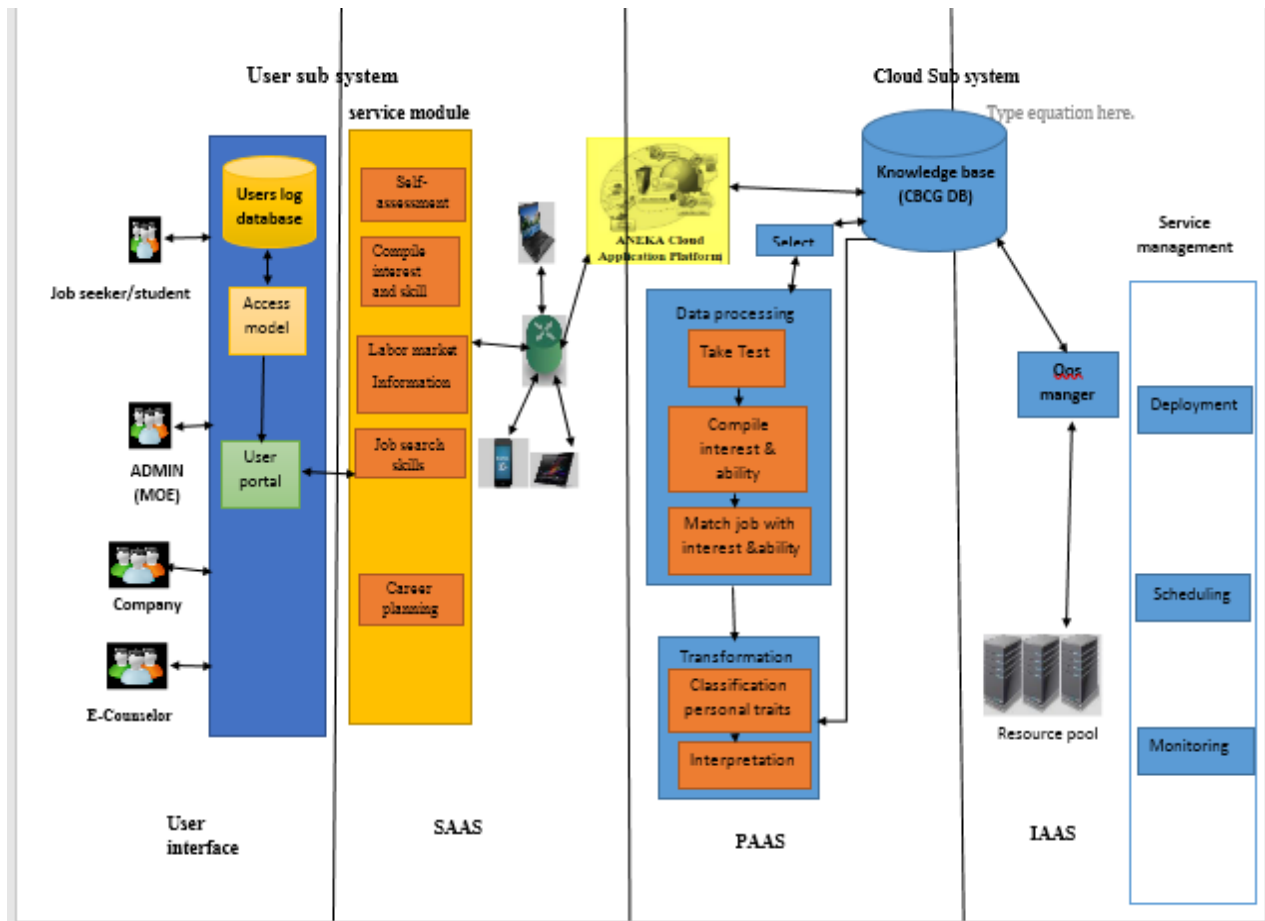
Figure2:Overview of CBCG architecture



5.3. Developing cloud-based career guidance framework

Existing Career Guidance systems are not capable of satisfying the needs of today's generation due to omitted of essential requirements like processing speed, lesser data storage space, reliability, availability, scalability etc. and even the information in computer-based Career Guidance systems are not used efficiently. To resolve the problem of existing computer-based Career Guidance systems, there is a need to develop a Cloud-Based Career Guidance system framework (CBCG) which delivers Career Guidance Services at the platform as service level (PaaS). In this section, the framework of Cloud-Based career guidance System for career guidance service manages various types of career guidance related data based on different functionalities. The framework of CBCG is shown in **Figure 3** below. The main functionalities of this proposed framework are: 1) get Personality information from various users through career self-assessment, 2) analyze the information by creating various classes based on the information received using Holland's theory, 3) match occupations with created classes, 4) store the classified information in cloud repository for future use and 4) to respond the user queries automatically based on the information stored in repository. Services of CBCG is divided into three types: SaaS (Software as a Service), PaaS (Platform as a Deal) and IaaS (Infrastructure as a Service). In SaaS, the user interface is designed in which users can interact with the system. Aneka is a.NET-based application development PaaS, which is used as a scalable cloud middleware to make the interaction between cloud subsystem and user subsystem. Cloud-based Career Guidance system provides a user interface through Aneka cloud application platform in which user can access service from any geographical location and information is classified, stored into cloud repositories and retrieved automatically based on user request at platform level. In IaaS, autonomic resource manager manages the resource automatically based on the identified QoS requirements of a particular request. The framework of CBCG consists of following two subsystems: user subsystem and cloud subsystem.

Figure 3: a framework of cloud-based career guidance



5.3.1. User subsystem

This subsystem provides a user interface, in which different type of users are interacting with CBCG to provide and get useful information about a career in different critical career areas. The User Interface layer contains three important components:

1. User log

In the cloud computing environment applications and data are hosted outside of the organization, for this reason, the cloud service provider has to use Authentication and Authorization mechanism. Authentication means that each user has a uniqueness which can be right hand as genuine. This is necessary because some resources may be authorized only to certain users, or certain classes of users. Authentication systems provide answers to the questions: Who is the user? Is the user really who he/she represents himself to be? Authorization is the instrument by which a system governs

what level of access a particular authenticated user should have to secure resources controlled by the system.

2. User Portals:

User portal provides an access path to CBCG web applications or services since everything is located on the web and can be accessed using a network connection.

3. Service module

Service module contains different types of services with detailed information about the additional access information, such as what layer the service is located and who can access this specific service. The Service module helps users in five critical career areas: self-assessment/self-discovery, compile one's interest and ability, labor market information, job search skills and career planning. Users of the CBCG are basically classified into four categories: user, E-counselor, Administrator, and company.

User: refers to either Students or Jobseeker. The user can register in the system and be able to use its features such as taking career test that will help them in making the decision for their future. students in university level can find a part-time job during their vacation using job search module. Also, for final year students who need to do their training to find a suitable job for them. People who are looking for jobs can use this system to find and search for jobs that by viewing the company profile before applying for the job.

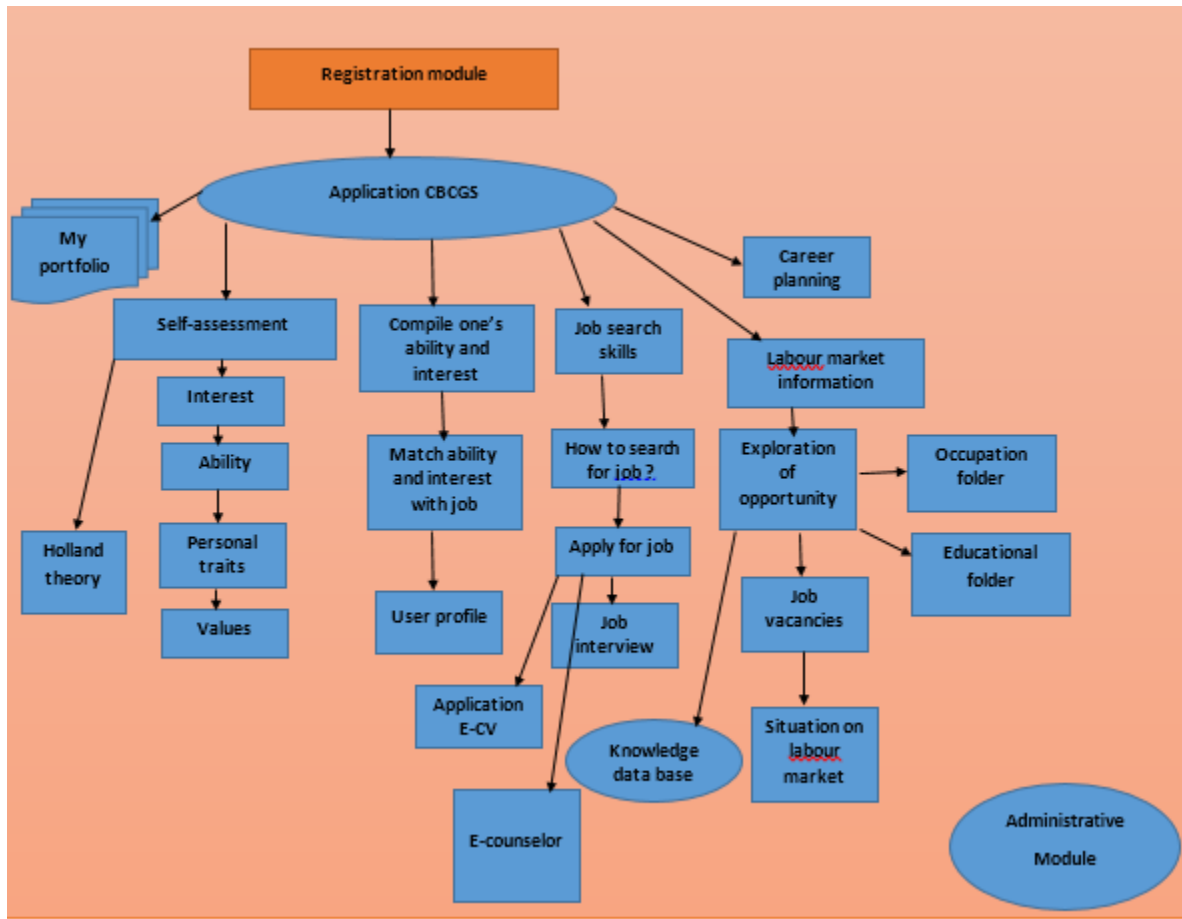
Companies / Organization: Companies can use this system to search for candidates, create various job postings, and track the applied candidates. Furthermore, they can request or apply for a career talk, seminar or workshop regarding careers.

Advisors / Consultants: Advisor can give the advice for both company and normal users such as students or job seekers. In addition, the advisor can post and create an event to help another system user.

5.3.2. Cloud subsystem

This subsystem contains the platform in which career web service is hosted on a cloud. Career web service allows processing the career information provided by users (student and job seeker). Users are basically classified into four categories: user, counselor, Administrator, and company as already discussed. These details are stored in cloud repository in different classes with a unique identification number.

Figure 4: processes modules in cloud subsystem of CBCGS



Cloud subsystem is set up by module structure.

A. Module self-assessment

This section includes Interests, Other characteristics, and Competences. interest section shows Holland's theory of interests and personality and a short description of Holland's six types (RIASEC). Other characteristics include personal characteristics, abilities, and values. Personality characteristics establish links between job and personality characteristics, explain why are important for employers and include a personality questionnaire. Section Abilities help users to be aware of their own abilities with an aim to use the abilities as an advantage in the job finding process. The content explains what abilities are, why are important for the employers, and which abilities are typical for the user. Section values explain what they are, uncover a role of motivation connected to work satisfaction and contain a questionnaire of values.

B. Module compiles one's ability and interest with the occupation

This section is responsible for a whole analysis of the results of an aptitude assessment for both skill and interest and additionally analyzes the user's individual traits and values. Based on these results, it creates a list of occupations appropriate for the user.

C. Module decision making /job search skills

This section shows that careers do not only depend on interests but increasingly on labor market and competences we gained by learning and working. The user here gets the whole list of interesting jobs and occupations – they have to choose the most suitable occupations. The user can assess job objectives comparing demands of the job with his/her competences and frequency of the vacancies in the labor market. The purpose of the module is to help users to recognize the importance of pre-emptive job search. It provides information and learning activities that reinforce the development of competences in three basic areas: How to search for a job, applying for a job and Job interview. Section “How to search for a job” supports user to understand characteristics of the labor market, raise awareness of pre-emptive job search, learn how to find possible job opportunities and to recognize the importance of discovering job opportunities and successfully entering on the hidden job market. Section “Applying for a job” main purposes are to raise awareness of self-understanding and researching potential of the employer before writing resumes and cover letters, to learn how to write targeted resumes and cover letters and to use application e-CV for creating online resumes. Section “Job interview” helps the user to understand the importance of interviews, to prepare for an interview, to practice responses to potentially difficult questions and to present oneself well at selection interviews.

D. Module labor market information

This section of CBCG enables the job seeker to explore the structure of labor market. Users can explore occupations through different types of work. Occupations with job description have a word document so the user can read the description of the occupation and find out some statistical data of the separate occupation. Exploration of opportunities by education: User can write his/her educational title and computer shows all jobs one can get with this education. A search of relation from education to occupations enables user to find out which occupations can be performed with an acquired education or with education user wants to gain. This data is also useful for the user to define employment aims and in search for Job Vacancies. A review of occupations is possible by

single occupation or by occupational groups. A relation between occupation and education show what kind of education user need for performing the desired occupation. Objectives of the education/occupation investigation service are to widen knowledge on employment opportunities for job seekers and to widen knowledge on educational possibilities in the frame of vocational guidance. Job vacancies (JV) database contains information on different occupations and information such as classification codes, short 300 word or fewer descriptions of the occupation, required aptitude (characteristics in interests and ability), number of people engaged, gender ratio, necessary qualifications and certificates and national region of job vacancy

E. Module career planning

This section help user to testing his /her compatibility with their preferred occupations by inputs the occupations he/she personally interested in hunting. Then the system indicates if the user's personal profile from Ability and Interest match the required Ability and Interest of listed occupations. This help user to make the right decision in either changing job or further educations.

5.4. Prototype development

This subchapter discussed how the proposed framework can be implemented and become usable to the educational ecosystem. It describes the highest-level view of the system how it looks like and how it works if it will be implemented and the programming tools to implement the framework.

5.4.1. The development environment

The programming language that is used to build the prototyping is called ASP.net. The ASP.net platform 2010 version defines a sample standard that applies to all aspects of architecting, developing, deploying and managing multi-tier server-based application The ASP.net language was selected because it supported by Aneka and moreover it easy to develop application since it is easy to design application using its graphics controls.

5.4.2. The prototype modeling

A model is an abstraction describing a system or a subset of a system. different kinds of UML (Unified Modeling Language) diagrams used to model the functionality and Sequence of activities

of the system. The functionality of the system has described by using use case diagrams which describes the functionality of the system from the user's point of view and Sequence of activities of the system by using sequence diagrams which describe the sequence of messages exchanged among a set of objects.

5.4.3. Use case diagram

Figure 5 illustrates the use case diagram of all actors and their functions in the system. For example, the user can register and log in and then they can search for a job, take the test and apply for a job.

Actors and their related use case identification

Users of the CBCG are basically classified into four categories: user, E-counselor, Administrator, and company.

Actor name: User refers to either Students or Jobseeker.

Related use cases:

- ✓ Register
- ✓ Login
- ✓ Take test
- ✓ Search job
- ✓ Apply for job
- ✓ Update information
- ✓ Participate in forum

Actor name: Companies / Organization:

Related use cases:

- ✓ Login
- ✓ Get advisor
- ✓ Post job description
- ✓ Check job application
- ✓ Participate in forum

Actor name: Advisors / E-Counselor

Related use cases:

- ✓ Login
- ✓ Check advice request
- ✓ Participate in forum

Actor name: Admin

Related use cases:

- ✓ Login
- ✓ Approve new advisor
- ✓ Add new advisor
- ✓ Check company list
- ✓ Check user list
- ✓ Check advisor list
- ✓ Delete company account
- ✓ Delete user account
- ✓ Delete advisor account

5.4.4. Sequence diagram

A sequence diagram is a dynamic model of use cases, showing the interaction among classes during a specified time period. sequence diagram was used to formalize the behavior of the system and to visualize the communication among objects. This diagram describes the flow of messages, events, actions between objects and shows time sequences that are not easily depicted in other diagrams.

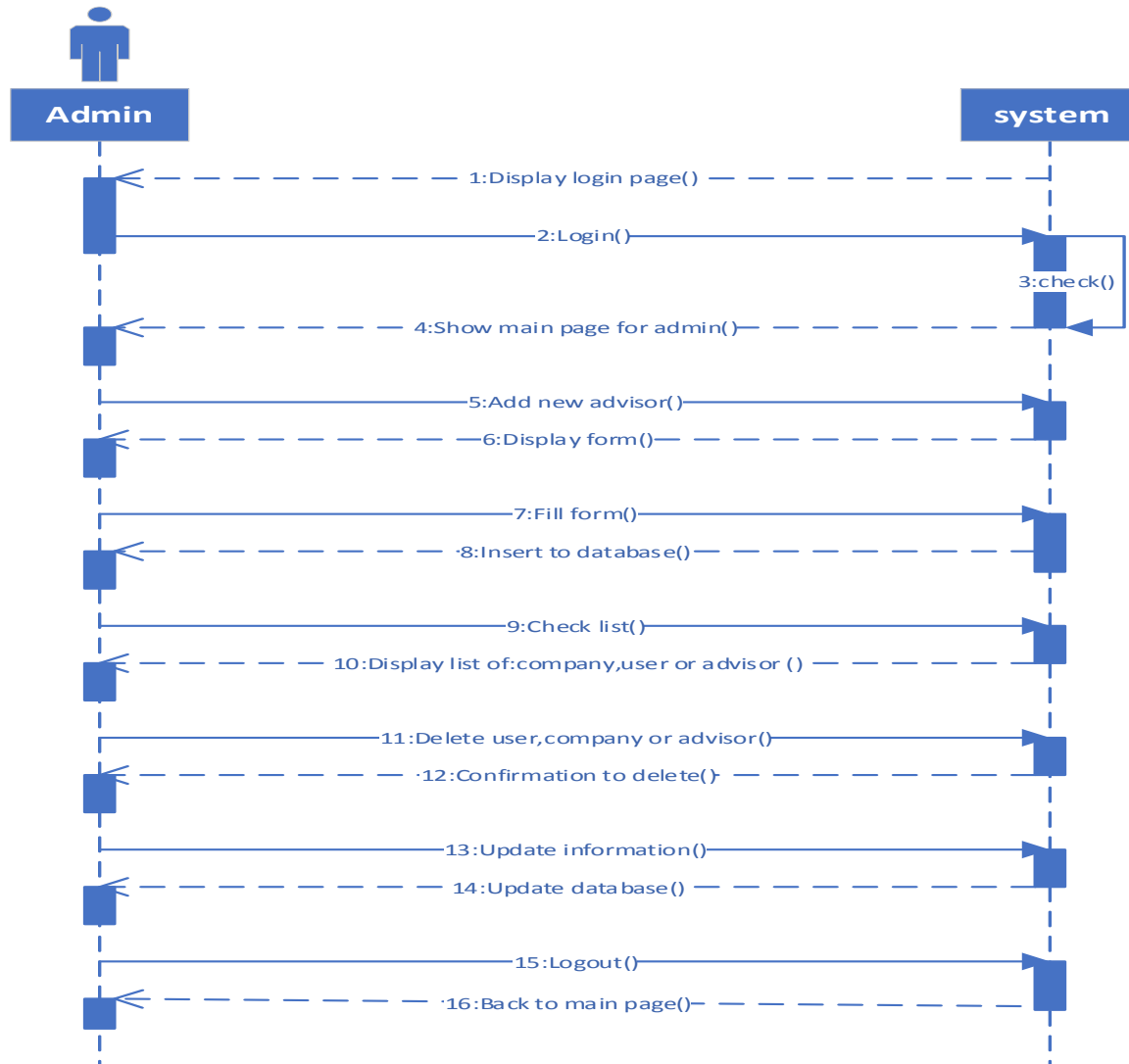


Figure 6: Admin sequence diagram to add, update and delete user ,company and advisors

5.4.5. Class diagram

The class diagram shows the relationship between all tables in the databases and what type of relationship. Admin table has a relationship with user, advisor and company tables. Meanwhile, user table has relation to application table, job, advisor and test table.

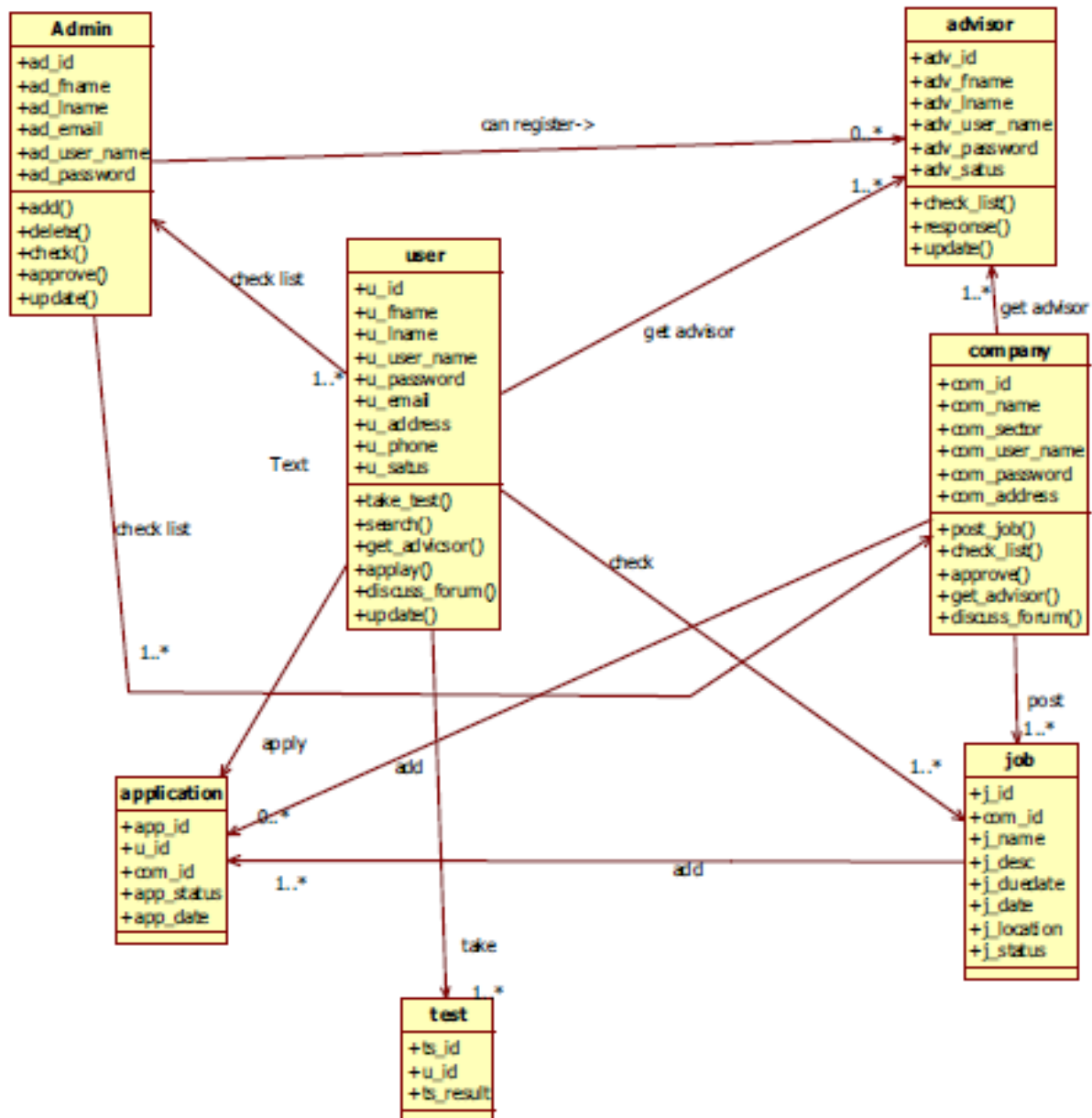


Figure 7: Class diagram

5.4.6. The screen snapshot of the prototype

In this section, some of the sample application interfaces snapshots have been included.

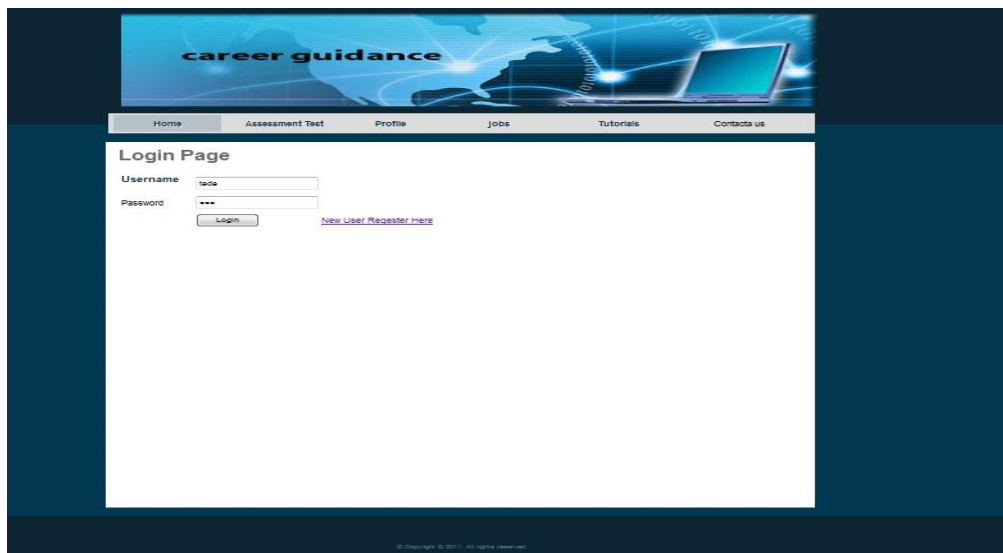


Figure 8: Login page

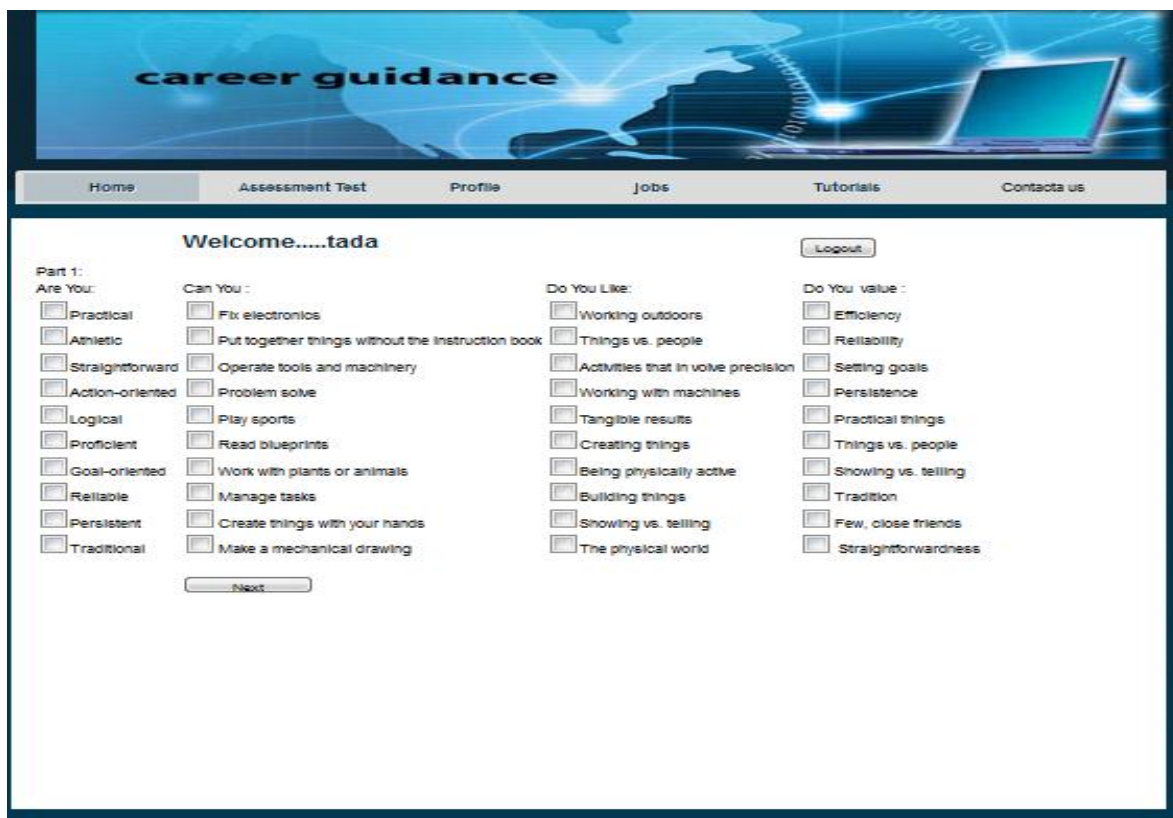


Figure 9: Personal Assessment test page

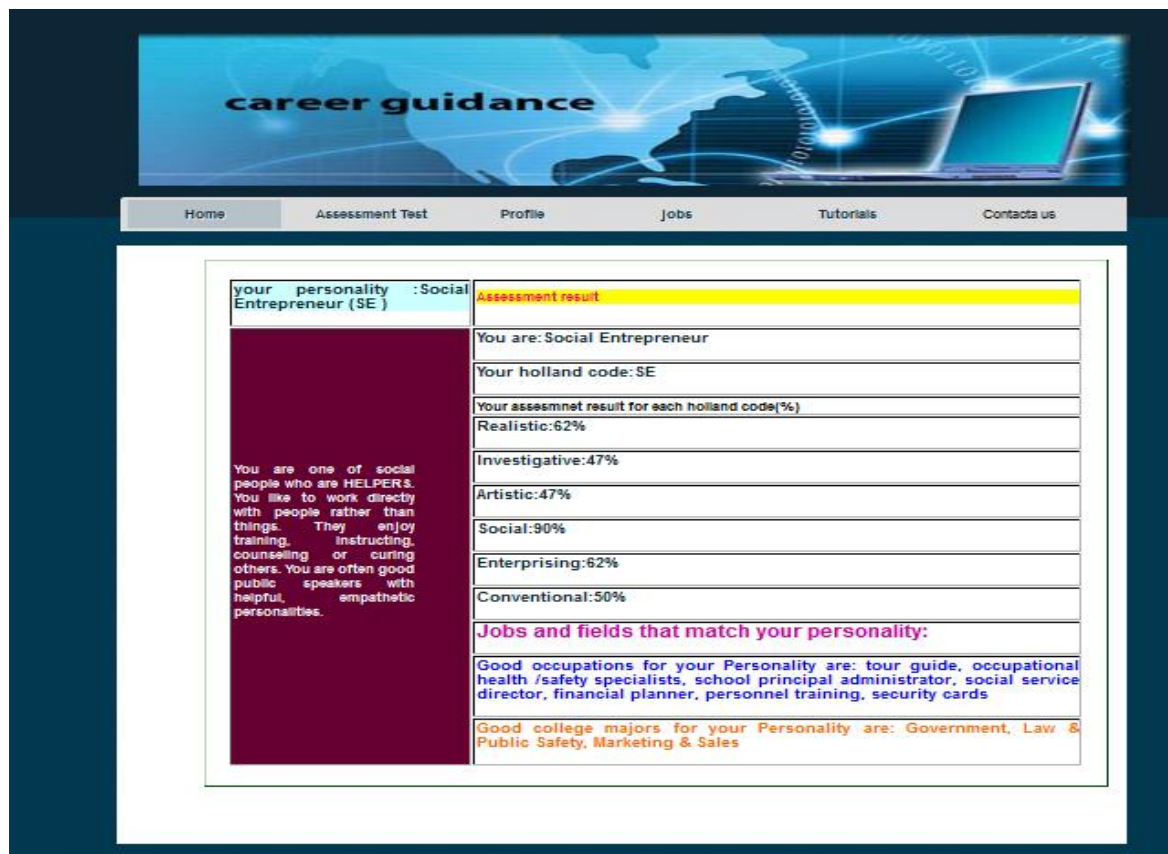


Figure 10: Personal profile page

CHAPTER SIX

6. DISCUSSION, CONCLUSION, AND RECOMMENDATION

6.1. Discussion

Career maturity refers to the individual's willingness to make up-to-date, age-appropriate career choices and cope with career development tasks (Savickas, 1999). Through this study, the emphasis was given to recognize the level of career maturity of university students and an alternative solution to cost effectively expand career guidance service in order to develop proper career guidance framework to use career guidance programs in the university and that will be scalable easily to other level of educational institutions.

The interview results clearly show that there should be an integrated system that will help to expand the service of career guidance in all universities. However, setting up and administration of career guidance system in each university found to be cost. This because there are lack of career guidance advisors and most universities have no career guidance centers yet. In order Solve the problem of lack of career guidance centers and career guidance experts needed it requires time and training cost which will affect the urgent need of career guidance in Ethiopia. There for this study proposed cloud computing framework to overcome the problems by considering the costs that need to setup career centers, to train career expert, to update career guidance system needed, storage cost and elasticity costs. The question here is how cloud-based career guidance system framework save these costs. The cloud-based career guidance system framework should be owned by MOE so that there should be only one career guidance center at national level which will be accessed by all HEIs and employment offices. When framework is owned by MOE career experts required will be less in number and the cost that lost for opening career guidance centers and training career advisors will be reduced. Moreover, career guidance system update cost is reduced since at cloud level only single instance of application is updated compared to web-based application that need updating of all instances of application in each center. Another issue that need cloud computing as solution is Storage cost. Since the customers of the proposed system are students, universities, employment companies and other educational institution that require huge storage capacity that will not be easy without help of cloud computing.

Indeed, this study identified students have high levels of career immaturity, passive involvement in the career decision-making process and limited acquisition of information about the world of work. These problems, combined with the influence of families and friends in the decisional process, weakens students' vocational decisions and makes their path not to be a solid one. The lack of self-knowledge, the problems encountered in finding job opportunities, the focus placed on a single employer, without a proper match between student's personal interests and values and the professional environment turns the entire decisional process into an inordinate matter. Students place their career indecision on the lack of information concerning the possible alternatives or on the contradictory interest for different domains, showing once again that they do not have an active interest in making career decisions. They do not hold the necessary information to make career-related decisions, either do they have the necessary tools to decide between different options.

The results of the study showed poor abilities in career explorations and also in the decision-making process that can be a result of poor information and also of an incomplete image of them as job candidates. Moreover, results showed students enter in a decision making upset without having any kind of understanding about themselves or about the career field. They are orientated to find a job in their study related field, without knowing their career abilities or interest. Going further, when finding jobs, there are graduates who ignored the development space and development prospects of their job, they just care about salary and fringe benefits, they don't think about self-condition and social needs, hazy vocational values make them couldn't have an exact realize about what job they like and suit them, it's obvious that the lack of career planning caused much pressure for employment. In addition, this study discovered that internet is the main source for information for students, but they are not using specialized websites or career platforms.

All these aspects have determined to design cloud-based career guidance framework that focuses on increasing students' awareness on the importance of active involvement in pursuing a career, in assuming a critical perspective on accessed content and in developing the professional competencies employers are looking for. Career guidance services could raise awareness among students concerning the need to act responsibly when facing a career-related problem. This study

comes to an agreement with Borgen's view (1991), according to whom individuals play an active role in their own career shaping process, both at the academic and behavioral level. Therefore, career guidance is an educational construct where the individual is supported in knowing oneself and then use this information to become useful and effective inside the society to which one belongs. This implies from the individual's side, the development of one's capacity to explore one's own vocational profile and potential, but also one's limits, the problems one's face and the identification of realistic and rational solutions to solve them under the supervision of a specialist.

Numerous studies indicated that career guidance offered to young people and adolescents in order for them to discover their abilities, skills, interests, and values significantly correlate with academic and professional satisfaction and implicitly with career success (Abera and Gobena, 2016). Career guidance programs should play an important role in allowing students to take a more active role in the career decision-making process and to engage in activities that could increase their employability.

6.2. Conclusion

Based on the results of the study, the following conclusions have been drawn.

Cloud based career guidance framework found to be cost effective solution in expand the access to career guidance service when it administrated and managed by MOE. Therefore, the proposed career guidance system framework was designed using Microsoft Azure-based cloud infrastructure to narrows the gaps of storage, integrated system update cost, scalability cost and the cost required for training career advisors to improve and expand the access of the career guidance service in all educational institutions of Ethiopia. Moreover, MOE should have to develop national policy that enable them to implement the proposed framework for universities and employment offices.

The result of this study also presented career development was found to be significant in understanding students' personal values, clarifying their goals, career choices and direction, and job-searching skills. However, career experts reported that information on career development is poor. As a result, the students do not know where to obtain career-related information, resulting in lack of future direction and decrease in performance.

Career development services through traditional consultancy services from parents, elders, and peers may lead students to make unreasonable choices. Therefore, Institutions of higher education are appropriate partners in supporting the school to work transition since they allocate huge budgets in marketing in general and community outreach in particular.

Scientific career development services should help to provide necessary information about the course of the study, information about the world of work, labor market information and relevant information about abilities and skills in terms of related qualifications and competencies required to take up the identified training program. Career development services are relevant in assisting students to recognize job opportunities and job availabilities in the area of their studies and enable them to avoid wasting time in training for vocations to which they are unsuited.

The career development services offered in the university were not enough and also not strong enough to provide adequate information about the characteristics of different vocational fields, labor market information, and skills required by different vocational fields. Moreover, the study discovered that career development service was not given adequately in the educational institutions. Therefore, the availability of the services is limited. As a result, this reality has adversely affected the training program as a whole. Using the intake capacity of higher education institutions as a major criterion can be a cause for some problems like unemployment of trained personnel. Therefore, it is the responsibility of Universities in developing students' abilities and competencies in order to increase students' employability.

Finally, career guidance alone does not lead to delivery of jobs or eradication of poverty. National governments, therefore, need to create an economic environment that encourages the growth of enterprises and generally stimulates the economy. Moreover, there should be national policy that would handle the higher education institutional system must adopt career guidance and be labor-market relevant, efficient and of high quality.

6.3. Recommendation

- Career guidance and education should focus more on creating career self-awareness, and it should adopt a strategy to improve career information and planning among students.
- The Ministry of Education should design a national policy that would help education institutions to adopt career guidance and be labor-market relevant, efficient and of high quality.

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8. Appendix

A. Information sheet for counselors /careers advisors

Title of Thesis: DESIGNING CLOUD BASED CAREER GUIDANCE FRAMEWORK TO USE CAREER GUIDANCE AND EDUCATION SYSTEM IN ETHIOPIAN HIGHER EDUCATION INSTITUTIONS

My name is Tadesse Dejene and I am currently enrolled in the Master of software engineering degree in the Department of software engineering Adama science and technology university(ASTU). I would like to seek your help in meeting the requirements of research for a thesis course which forms a substantial part of this degree. The main objective of this study will be building the cloud-based framework that helps to include career guidance into university to help graduate job search and equip them with skills needed by labor market policies and employment strategies in order to facilitate school to work transitions. You are invited to participate in a short questionnaire which will help to identify themes and issues around this important topic. Neither you nor your organization will be identified in the Thesis and your questionnaire results will be coded to ensure anonymity. I do hope that you will agree to take part and that you will find this participation of interest. If you have any queries about the research, you may contact my Advisor at ASTU, Mr. Bahira Shefia. He may be contacted by phone on (09) 67265822 or email sbahiru@gmail.com

Yours sincerely

Tadesse Dejene

B. Questioner questions for career experts

Part-I Socio-demographic characteristics

1. Sex: A. male B. female
2. Age () -----(in year)
3. Marital status
 - A. Married
 - B. Single
 - C. Divorced
 - D. Widowed
4. Religion
 - A. Orthodox
 - B. Protestant
 - C. Catholic
 - D. Other
(specify)_____
5. Educational status
 - A. Diploma
 - B. Degree
 - C. MSc
 - D. PHD

Part-II Questions related to career guidance and education

1. How long have you been working as a Careers expert/Advisors?
_____ (in year)
2. How long have you been working in your current institution?
_____ (in year)
3. Are you the only person in your department?
 - A. Yes
 - B. No
4. What percentage of your hours are spent working as careers experts / Advisors as opposed to teaching?
_____ (in %)
5. How would you imagine about the status of career guidance in your current institution?
 - A. Poor
 - B. Good
 - C. Very good

10. Do you think students should be consulted about what they require from careers education and guidance?

A. Yes

B. No

11. What is the importance of career guidance and education services for the students in your point of view? Please rank each line.

Items	Agree	Disagree	Not sure
Helping students to understand their personal values			
Helping Students to clarify their career Goals			
Helping students in choosing their career direction			
Assessing students' skills and Abilities			
Locating career information for the students			
Helping students' in job-searching techniques			
Developing students' interview skills			
Developing decision-making skills			
Identifying obstacles to students' career choice			
Helping in writing résumé			

*Thank you so much for taking the time to complete this questionnaire to assist me with My master's degree thesis. I trust the results will be valuable to the professional body of careers advisors. I hope to present my findings at the 2018 thesis defenses. **Tadesse Dejene.***

C. Interview questions for career experts

1. Do you think that it is cost to have career guidance centers in all HEIs to expand career guidance access? What do you think will be the reason?
2. Do you think we need integrated system to elasticity career guidance service in all HEIs?

D. Questioner questions for Final year student

Part-I Socio-demographic characteristics

1. Sex: A. male B. female
2. Age () -----(in year)
3. Academic year level
 - a. I
 - b. II
 - c. III
 - d. IV
 - e. VI
4. Admission type
 - a. Regular
 - b. Extension

Part-II Questions for evolution of prototyping

Question	Yes	No
1. Has the system helped you understanding your own ability and interest?		
2. Does the aptitude rating supplied by system conform with your own self-image?		
3. Has the system helped you understand what type of work suit you?		
4. Does the type of work system selected for you meet your image?		
5. Has the system helped clarify what work you should pursue?		
6. Has the system helped you understand the next step you must take to find a job?		
7. Was the system interesting to use?		
8. Was the system easy to use?		
9. Do you want to use system again?		
10. Is the system useful in selecting future occupations?		

Thank you!!!

D. The login View from

```
1. <%@ Page Language="C#" AutoEventWireup="true" CodeFile="Login.aspx.cs"
   Inherits="Login" MasterPageFile="~/careermaster.master" %>
2. <asp:content ID="content1" ContentPlaceHolderID="ContentPlaceHolder1" runat="server">
3.   <form id="form8" runat="server">
4.     <div class="style5" style="height: 52px; width: 222px;">
5.       <p>
6.         <strong style="font-size: xx-large; text-align: center;">Login Page</strong></p>
7.     </div>
8.     <table class="style1" style="width: 99%; height: 61px;">
9.       <tr>
10.        <td class="style3">
11.          <asp:Label ID="Label1" runat="server" Text="Username "></asp:Label>
12.        </td>
13.        <td class="style2">
14.          <asp:TextBox ID="uname" runat="server" Width="180px"></asp:TextBox>
15.        </td>
16.        <td class="style26">
17.          <asp:RequiredFieldValidator ID="RequiredFieldValidator1" runat="server"
18.            ControlToValidate="uname" ErrorMessage="Please enter user name "
19.            ForeColor="#FF0066"></asp:RequiredFieldValidator>
20.        </td>
21.      </tr>
22.      <tr>
23.        <td class="style3">
24.          Password</td>
25.        <td class="style2">
26.          <asp:TextBox ID="pw" runat="server" TextMode="Password"
   Width="180px"></asp:TextBox>
27.        </td>
28.        <td class="style29">
29.          <asp:RequiredFieldValidator ID="RequiredFieldValidator2" runat="server"
30.            ControlToValidate="pw" ErrorMessage="Please enter password"
31.            ForeColor="#FF0066"></asp:RequiredFieldValidator>
32.        </td>
33.      </tr>
34.      <tr>
35.        <td class="style9">
36.          User_type
37.        </td>
38.        <td class="style9">
39.          <asp:DropDownList ID="User_type" runat="server" Width="180px">
40.            <asp:ListItem>select Account type </asp:ListItem>
41.            <asp:ListItem>Admin</asp:ListItem>
42.            <asp:ListItem>Advisor</asp:ListItem>
43.            <asp:ListItem>User</asp:ListItem>
44.            <asp:ListItem>Company</asp:ListItem>
45.          </asp:DropDownList>
46.        </td>
```

```

47.         <td class="style9">
48.             <asp:RequiredFieldValidator ID="RequiredFieldValidator9" runat="server"
49.                 ControlToValidate="User_type"      ErrorMessage="incorrect      Account      type"
ForeColor="#FF0066"
50.                 InitialValue="select Account type "></asp:RequiredFieldValidator>
51.         </td>
52.     </tr>
53.     <tr>
54.         <td class="style3">
55.         </td>
56.         <td class="style2">
57.             <asp:Button ID="Button1" runat="server" onclick="Button1_Click" Text="Login"
58.                 Width="100px" />
59.         </td>
60.         <td class="style22">
61.             <asp:HyperLink
ID="HyperLink1"
runat="server"
NavigateUrl="~/Registration.aspx">New User Regester Here</asp:HyperLink>
62.         </td>
63.     </tr>
64. </table>
65. </form>
66. </asp:content>
67.
68. <asp:Content ID="Content2" runat="server" contentplaceholderid="head">
69.     <style type="text/css">
70.         .style1
71.         {
72.             width: 436px;
73.         }
74.         .style2
75.         {
76.             width: 193px;
77.         }
78.         .style3
79.         {
80.             width: 112px;
81.         }
82.     </style>
83. </asp:Content>

```

E. The login controller

```
1. using System;
2. using System.Collections.Generic;
3. using System.Linq;
4. using System.Web;
5. using System.Web.UI;
6. using System.Web.UI.WebControls;
7. using System.Data.SqlClient;
8. using System.Configuration;
9.
10. public partial class Login : System.Web.UI.Page
11. {
12.     string pasword1 = null, stat = null, ut=null, un1=null;
13.
14.     protected void Page_Load(object sender, EventArgs e)
15.     {
16.
17.     }
18.     protected void Button1_Click(object sender, EventArgs e)
19.     {
20.         SqlConnection conn = new
21.         SqlConnection(ConfigurationManager.ConnectionStrings["AssessmentConnectionString"].C
22.         onnectionString);
23.         conn.Open();
24.         string checkuser = "select count(*) from userdata where Username ='" + uname.Text + "'";
25.         SqlCommand com = new SqlCommand(checkuser, conn);
26.         int temp = Convert.ToInt32(com.ExecuteScalar().ToString().Replace(" ", ""));
27.         conn.Close();
28.         if (temp == 1)
29.         {
30.             conn.Open();
31.             string checkpass = "select Password,Status,Account_type,Username from userdata where
32.             Username ='" + uname.Text + "'";
33.             SqlCommand comm = new SqlCommand(checkpass, conn);
34.             var r = comm.ExecuteReader();
35.             if (r.HasRows)
36.             {
37.                 {
38.                     while (r.Read())
39.                     {
40.                         pasword1 = r["Password"].ToString();
41.                         stat = r["Status"].ToString();
42.                         un1 = r["Username"].ToString();
43.                         ut = r["Account_type"].ToString();
44.                     }
45.                 }
46.                 r.Close();
47.                 string np = "NOT_Approve ";
48.
49.                 if (ut.Trim() != User_type.Text.Trim())
50.                 {
51.
52.                 }
53.
54.             }
55.             else
56.             {
57.                 string np = "NOT_Approve ";
58.
59.                 if (ut.Trim() != User_type.Text.Trim())
60.                 {
61.
62.                 }
63.
64.             }
65.
66.             if (pasword1 == Password1.Text)
67.             {
68.                 if (stat == "Approved")
69.                 {
70.                     Response.Redirect("~/Default.aspx");
71.                 }
72.                 else
73.                 {
74.                     string np = "NOT_Approve ";
75.
76.                     if (ut.Trim() != User_type.Text.Trim())
77.                     {
78.
79.                     }
80.
81.                 }
82.             }
83.             else
84.             {
85.                 string np = "NOT_Approve ";
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87.                 if (ut.Trim() != User_type.Text.Trim())
88.                 {
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92.             }
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94.             if (stat == "Not Approved")
95.             {
96.                 string np = "NOT_Approve ";
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98.                 if (ut.Trim() != User_type.Text.Trim())
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105.             if (stat == "Not Approved")
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107.                 string np = "NOT_Approve ";
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109.                 if (ut.Trim() != User_type.Text.Trim())
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470.                 string np = "NOT_Approve ";
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941.             if (stat == "Not Approved")
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943.                 string np = "NOT_Approve ";
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954.                 string np = "NOT_Approve ";
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965.                 string np = "NOT_Approve ";
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1051.             if (stat == "Not Approved")
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1053.                 string np = "NOT_Approve ";
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1117.             if (stat == "Not Approved")
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1119.                 string np = "NOT_Approve ";
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1121.                 if (ut.Trim() != User_type.Text.Trim())
1122.                 {
1123.
1124.                 }
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1126.             }
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1128.             if (stat == "Not Approved")
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1392.             if (stat == "Not Approved")
1393.             {
1394.                 string np = "NOT_Approve ";
1395.
1396.                 if (ut.Trim() != User_type.Text.Trim())
1397.                 {
1398.
1399.                 }
1400.
1401.             }
1402.
1403.             if (stat == "Not Approved")
1404.             {
1405.                 string np =
```

```

48. ClientScript.RegisterClientScriptBlock(GetType(), "sas", "javascript:alert("'" + "incorrect
    Account type" + "'"");", true);
49.     }
50.     else if (stat.Trim() == np.Trim())
51.     {
52.         ClientScript.RegisterClientScriptBlock(GetType(), "sas", "javascript:alert("'" +
    "Sorry,you are not approved as user type you have selected. please contact system Admin" +
    "'"");", true);
53.     }
54.
55.     else if (password1.Trim() == pw.Text.Trim())
56.     {
57.         Session["New"] = uname.Text;
58.         Response.Redirect("CareerTest.aspx");
59.     }
60.     else
61.     {
62. ClientScript.RegisterClientScriptBlock(GetType(), "sas", "javascript:alert("'" + "incorrect
    password" + "'"");", true);
63.     }
64.     }
65.     else {
66. ClientScript.RegisterClientScriptBlock(GetType(), "sas", "javascript:alert("'" + "incorrect
    username" + "'"");", true);
67.     }
68. conn.Close();
69. }
70. }

```

F. The assessment test view form

```
1. <%@ Page Language="C#" AutoEventWireup="true" CodeFile="Test6.aspx.cs"
   Inherits="_Default" MasterPageFile="~/careermaster.master"%>
2. <asp:Content ID="content8" ContentPlaceHolderID="ContentPlaceHolder1" runat="server">
3.
4.     <form id="form7" runat="server">
5.         <div>
6.             <table class="style1">
7.                 <tr>
8.                     <td class="style4">
9.                         &nbsp;</td>
10.                    <td class="style2">
11.                        <asp:Label ID="welcom" runat="server"
12.                            style="font-size: x-large; font-weight: 700" Text="Welcome....."></asp:Label>
13.                    </td>
14.                    <td class="style11">
15.                        &nbsp;</td>
16.                    <td>
17.                        <asp:Button ID="Button2" runat="server" onclick="Button2_Click"
Text="Logout"
18.                            Width="91px" />
19.                    </td>
20.                </tr>
21.                <tr>
22.                    <td class="style3">
23.                        <strong>part 6:</strong></td>
24.                    <td class="style2">
25.                        &nbsp;</td>
26.                    <td class="style11">
27.                        &nbsp;</td>
28.                    <td>
29.                        &nbsp;</td>
30.                </tr>
31.                <tr>
32.                    <td class="style10">
33.                        Are You:</td>
34.                    <td class="style8">
35.                        Can You :</td>
36.                    <td class="style12">
37.                        Do You Like:</td>
38.                    <td class="style7">
39.                        &nbsp;<asp:Do You&nbsp;</td>
40.                </tr>
41.                <tr>
42.                    <td class="style4">
43.                        <asp:CheckBox ID="CheckBox1" runat="server" Text="Detail-oriented" />
44.                    </td>
45.                    <td class="style2">
```

```

46.         <asp:CheckBox ID="CheckBox12" runat="server" Text="Pay attention to
detail" />
47.     </td>
48.     <td class="style11">
49.         <asp:CheckBox ID="CheckBox23" runat="server"
50.             Text="Handling and Controlling money" />
51.     </td>
52.     <td>
53.         <asp:CheckBox ID="CheckBox34" runat="server" Text="Discipline " />
54.     </td>
55. </tr>
56. <tr>
57.     <td class="style4">
58.         <asp:CheckBox ID="CheckBox2" runat="server" Text="Organized" />
59.     </td>
60.     <td class="style2">
61.         <asp:CheckBox ID="CheckBox13" runat="server" Text="Follow orders" />
62.     </td>
63.     <td class="style11">
64.         <asp:CheckBox ID="CheckBox24" runat="server" Text="Numbers " />
65.     </td>
66.     <td>
67.         <asp:CheckBox ID="CheckBox35" runat="server" Text="Business success " />
68.     </td>
69. </tr>
70. <tr>
71.     <td class="style4">
72.         <asp:CheckBox ID="CheckBox3" runat="server" Text="Systematic" />
73.     </td>
74.     <td class="style2">
75.         <asp:CheckBox ID="CheckBox14" runat="server" Text="Work a computer" />
76.     </td>
77.     <td class="style11">
78. <asp:CheckBox ID="CheckBox25" runat="server" Text="Working with computers" />
79.     </td>
80.     <td>
81.         <asp:CheckBox ID="CheckBox36" runat="server" Text="Clear standards" />
82.     </td>
83. </tr>
84. <tr>
85.     <td class="style4">
86.         <asp:CheckBox ID="CheckBox4" runat="server" Text="Practical" />
87.     </td>
88.     <td class="style2">
89.         <asp:CheckBox ID="CheckBox15" runat="server" Text="Work with numbers" />
90.     </td>
91.     <td class="style11">
92.         <asp:CheckBox ID="CheckBox26" runat="server" Text="Concrete tasks" />
93.     </td>
94.     <td>
95.         <asp:CheckBox ID="CheckBox37" runat="server" Text="Routine" />

```

```

96.         </td>
97.     </tr>
98.     <tr>
99.         <td class="style4">
100.             <asp:CheckBox ID="CheckBox5" runat="server" Text="Efficient" />
101.         </td>
102.         <td class="style2">
103.             <asp:CheckBox ID="CheckBox16" runat="server"
104.                 Text="Keep accurate records/files" />
105.         </td>
106.         <td class="style11">
107.             <asp:CheckBox ID="CheckBox27" runat="server"
108.                 Text="Keeping accurate records/files" />
109.         </td>
110.         <td>
111.             <asp:CheckBox ID="CheckBox38" runat="server" Text="Practical things" />
112.         </td>
113.     </tr>
114.     <tr>
115.         <td class="style4">
116.             <asp:CheckBox ID="CheckBox6" runat="server" Text="Conscientious" />
117.         </td>
118.         <td class="style2">
119.             <asp:CheckBox ID="CheckBox17" runat="server" Text="Work efficiently" />
120.         </td>
121.         <td class="style11">
122.             <asp:CheckBox ID="CheckBox28" runat="server" Text="Collecting things" />
123.         </td>
124.         <td>
125.             <asp:CheckBox ID="CheckBox39" runat="server" Text="Order" />
126.         </td>
127.     </tr>
128.     <tr>
129.         <td class="style4">
130.             <asp:CheckBox ID="CheckBox7" runat="server" Text="Orderly" />
131.         </td>
132.         <td class="style2">
133.             <asp:CheckBox ID="CheckBox18" runat="server"
134.                 Text="Work in a clerical setting " />
135.         </td>
136.         <td class="style11">
137.             <asp:CheckBox ID="CheckBox29" runat="server" Text="Organizing data" />
138.         </td>
139.         <td>
140.             <asp:CheckBox ID="CheckBox40" runat="server" Text="Accuracy" />
141.         </td>
142.     </tr>
143.     <tr>
144.         <td class="style4">
145.             <asp:CheckBox ID="CheckBox8" runat="server" Text="Accurate" />
146.         </td>

```

```

147.         <td class="style2">
148.             <asp:CheckBox ID="CheckBox19" runat="server"
149.                 Text="Write effective business letters " />
150.         </td>
151.         <td class="style11">
152.         <asp:CheckBox ID="CheckBox30" runat="server" Text="Math, accounting " />
153.         </td>
154.         <td>
155.             <asp:CheckBox ID="CheckBox41" runat="server" Text="Organization " />
156.         </td>
157.     </tr>
158.     <tr>
159.         <td class="style4">
160.             <asp:CheckBox ID="CheckBox9" runat="server" Text="Disciplined" />
161.         </td>
162.         <td class="style2">
163.         <asp:CheckBox ID="CheckBox20" runat="server" Text="Enter data accurately" />
164.         </td>
165.         <td class="style11">
166.         <asp:CheckBox ID="CheckBox31" runat="server" Text="Working in an office" />
167.         </td>
168.         <td>
169.             <asp:CheckBox ID="CheckBox42" runat="server" Text="Detail " />
170.         </td>
171.     </tr>
172.     <tr>
173.         <td class="style4">
174.             <asp:CheckBox ID="CheckBox10" runat="server" Text="Persistent" />
175.         </td>
176.         <td class="style2">
177.             <asp:CheckBox ID="CheckBox21" runat="server"
178.                 Text="Follow clearly Defined procedures" />
179.         </td>
180.         <td class="style11">
181.             <asp:CheckBox ID="CheckBox32" runat="server"
182.                 Text="Generating written communication" />
183.         </td>
184.         <td>
185.             <asp:CheckBox ID="CheckBox43" runat="server" Text="Status" />
186.         </td>
187.     </tr>
188.     <tr>
189.         <td class="style4">
190.             &nbsp;</td>
191.         <td class="style2">
192.             &nbsp;</td>
193.         <td class="style11">
194.             &nbsp;</td>
195.         <td>
196.             &nbsp;</td>
197.     </tr>

```

```

198.         <tr>
199.             <td class="style4">
200.                 &nbsp;   </td>
201.             <td class="style2">
202.                 <asp:Button ID="Button1" runat="server" onclick="Button1_Click"
203.                     style="text-align: center; height: 26px; margin-left: 0px" Text="Next"
204.                     Width="125px" />
205.             </td>
206.             <td class="style11">
207.                 &nbsp;   </td>
208.             <td>
209.                 &nbsp;   </td>
210.         </tr>
211.         <tr>
212.             <td class="style4">
213.                 &nbsp;   </td>
214.             <td class="style2">
215.                 &nbsp;   </td>
216.             <td class="style11">
217.                 &nbsp;   </td>
218.             <td>
219.                 &nbsp;   </td>
220.         </tr>
221.         <tr>
222.             <td class="style4">
223.                 &nbsp;   </td>
224.             <td class="style2">
225.                 &nbsp;   </td>
226.             <td class="style11">
227.                 &nbsp;   </td>
228.             <td>
229.                 &nbsp;   </td>
230.         </tr>
231.         <tr>
232.             <td class="style4">
233.                 &nbsp;   </td>
234.             <td class="style2">
235.                 &nbsp;   </td>
236.             <td class="style11">
237.                 &nbsp;   </td>
238.             <td>
239.                 &nbsp;   </td>
240.         </tr>
241.     </table>
242.
243. </div>
244. </form>
245. </asp:Content>

```

G. The assessment test controller

```
1. using System;
2. using System.Collections.Generic;
3. using System.Linq;
4. using System.Web;
5. using System.Web.UI;
6. using System.Web.UI.WebControls;
7. using System.Data.SqlClient;
8. using System.Configuration;
9. public partial class _Default : System.Web.UI.Page
10. {
11.     protected void Page_Load(object sender, EventArgs e)
12.     {
13.         if (Session["New"] != null)
14.         {
15.             welcom.Text += Session["New"] = null + Session["New"].ToString();
16.         }
17.     }
18.     {
19.         Response.Redirect("Login.aspx");
20.     }
21. }
22. protected void Button1_Click(object sender, EventArgs e)
23. {
24.     try
25.     {
26.         SqlConnection conn = new
            SqlConnection(ConfigurationManager.ConnectionStrings["AssessmentConnectionString"].C
            onnectionString);
27.         conn.Open();
28.         int count = 0;
29.         string id = Session["New"].ToString();
30.         foreach (Control c in this.form7.Controls)
31.         {
32.             if (c is CheckBox)
33.             {
34.                 if (((CheckBox)c).Checked)
35.                     count++;
36.             }
37.         }
38.         string update = "update hollandcode set Conventional = " + count + " where uid=" +
            Session["New"].ToString() + " ";
39.         SqlCommand com3 = new SqlCommand(update, conn);
40.         com3.ExecuteNonQuery();
41.         conn.Close();
42.         conn.Open();
43.         int[] number = new int[6];
```

```

44. string select = "select Realistic,Investigative,Artistic,Social,Enterprising,Conventional,uid
    from hollandcode where uid='" + Session["New"].ToString() + "' ";
45. SqlCommand com2 = new SqlCommand(select, conn);
46. var reader = com2.ExecuteReader();
47. if (reader.HasRows)
48. {
49. while (reader.Read())
50. {
51. number[0] = reader.GetInt32(0);
52. number[1] = reader.GetInt32(1);
53. number[2] = reader.GetInt32(2);
54. number[3] = reader.GetInt32(3);
55. number[4] = reader.GetInt32(4);
56. number[5] = reader.GetInt32(5);
57. }
58. }
59. reader.Close();
60. int max1 = 0;
61. int max2 = 0;
62. int xx = 0, yy = 0;
63. for (int i = 0; i < 6; i++)
64. {
65. if (number[i] > max1)
66. {
67. max2 = max1;
68. max1 = number[i];
69. }
70. else if (number[i] > max2)
71. {
72. max2 = number[i];
73. }
74. }
75. for (int b = 0; b < 6; b++)
76. {
77. if (number[b] == max1)
78. xx = b;
79. else if (number[b] < max1 && number[b] == max2)
80. yy = b;
81. }
82. string hcode = " ";
83. // realastic type
84. if (xx == 0 && yy == 1 || yy == xx)
85. {
86. hcode = "RI";
87. if (number[yy] <= 12)
88. hcode = "R";
89. }
90. else if (xx == 0 && yy == 2 || yy == xx)
91. {
92. hcode = "RA";
93. if (number[yy] <= 12)

```

```

94. hcode = "R";
95. }
96. else if (xx == 0 && yy == 3 || yy == xx)
97. {
98. hcode = "RS";
99. if (number[yy] <= 12)
100.   hcode = "R";
101.   }
102.   else if (xx == 0 && yy == 4 || yy == xx)
103.   {
104.   hcode = "RE";
105.   if (number[yy] <= 12)
106.   hcode = "R";
107.   }
108.   else if (xx == 0 && yy == 5 || yy == xx)
109.   {
110.   hcode = "RC";
111.   if (number[yy] <= 12)
112.   hcode = "R";
113.   }
114.   else if (xx == 1 && yy == 2 || yy == xx)
115.   {
116.   hcode = "IA";
117.   if (number[yy] <= 12)
118.   hcode = "I";
119.   }
120.   else if (xx == 1 && yy == 3 || yy == xx)
121.   {
122.   hcode = "IS";
123.   if (number[yy] <= 12)
124.   hcode = "I";
125.   }
126.   else if (xx == 1 && yy == 4 || yy == xx)
127.   {
128.   hcode = "IE";
129.   if (number[yy] <= 12)
130.   hcode = "I";
131.   }
132.   else if (xx == 1 && yy == 5 || yy == xx)
133.   {
134.   hcode = "IC";
135.   if (number[yy] <= 12)
136.   hcode = "I";
137.   }
138.   else if (xx == 2 && yy == 3 || yy == xx)
139.   {
140.   hcode = "AS";
141.   if (number[yy] <= 12)
142.   hcode = "A";
143.   }
144.   else if (xx == 2 && yy == 4 || yy == xx)

```

```

145.  {
146.  hcode = "AE";
147.  if (number[yy] <= 12)
148.  hcode = "A";
149.  }
150.  else if (xx == 2 && yy == 5 || yy == xx)
151.  {
152.  hcode = "AC";
153.  if (number[yy] <= 12)
154.  hcode = "A";
155.  }
156.  else if (xx == 2 && yy == 0 || yy == xx)
157.  {
158.  hcode = "AR";
159.  if (number[yy] <= 12)
160.  hcode = "A";
161.  }
162.  else if (xx == 2 && yy == 1 || yy == xx)
163.  {
164.  hcode = "AI";
165.  if (number[yy] <= 12)
166.  hcode = "A";
167.  }
168.  else if (xx == 3 && yy == 0 || yy == xx)
169.  {
170.  hcode = "SR";
171.  if(number[yy]<=12)
172.  hcode="S";
173.  }
174.  else if (xx == 3 && yy == 1 || yy == xx)
175.  {
176.  hcode = "SI";
177.  if (number[yy] <= 12)
178.  hcode = "S";
179.  }
180.  else if (xx == 3 && yy == 2 || yy == xx)
181.  {
182.  hcode = "SA";
183.  if (number[yy] <= 12)
184.  hcode = "S";
185.  }
186.  else if (xx == 3 && yy == 4 || yy == xx)
187.  {
188.  hcode = "SE";
189.  if (number[yy] <= 12)
190.  hcode = "S";
191.  } else if (xx == 3 && yy == 5 || yy == xx)
192.  {
193.  hcode = "SC";
194.  if (number[yy] <= 12)
195.  hcode = "S";

```

```

196.     }
197.     else if (xx == 4 && yy == 0 || yy == xx)
198.     {
199.         hcode = "ER";
200.         if (number[yy] <= 12)
201.             hcode = "E";
202.     }
203.     else if (xx == 4 && yy == 1 || yy == xx)
204.     {
205.         hcode = "EI";
206.         if (number[yy] <= 12)
207.             hcode = "E";
208.     }
209.     else if (xx == 4 && yy == 2 || yy == xx)
210.     {
211.         hcode = "EA";
212.         if (number[yy] <= 12)
213.             hcode = "E";
214.     }
215.     else if (xx == 4 && yy == 3 || yy == xx)
216.     {
217.         hcode = "ES";
218.         if (number[yy] <= 12)
219.             hcode = "E";
220.     }
221.     else if (xx == 4 && yy == 5 || yy == xx)
222.     {
223.         hcode = "EC";
224.         if (number[yy] <= 12)
225.             hcode = "E";
226.     }
227.     else if (xx == 5 && yy == 0 || yy == xx)
228.     {
229.         hcode = "CR";
230.         if (number[yy] <= 12)
231.             hcode = "C";
232.     }
233.     else if (xx == 5 && yy == 1 || yy == xx)
234.     {
235.         hcode = "CI";
236.         if (number[yy] <= 12)
237.             hcode = "C";
238.     }
239.     else if (xx == 5 && yy == 2 || yy == xx)
240.     {
241.         hcode = "CA";
242.         if (number[yy] <= 12)
243.             hcode = "C";
244.     }
245.     else if (xx == 5 && yy == 3 || yy == xx)
246.     {

```

```

247.     hcode = "CS";
248.     if (number[yy] <= 12)
249.         hcode = "C";
250.     }
251.     else if (xx == 5 && yy == 4 || yy == xx)
252.     {
253.         hcode = "CE";
254.         if (number[yy] <= 12)
255.             hcode = "C";
256.     }

257.     //profile 2 data
258.     string datat = "select Hcode,Description,Job,field from profile where Hcode='" + hcode +
        ""';
259.     SqlCommand com4 = new SqlCommand(datat, conn);

260.     string persnolity2 = null,persnolity3 = null, persnolity4 = null, persnolity5 = null;
261.     var r = com4.ExecuteReader();
262.     if (r.HasRows)
263.     {

264.         while (r.Read())
265.         {

266.             persnolity2 = r["Hcode"].ToString();
267.             persnolity3 = r["Description"].ToString();
268.             persnolity4 = r["Job"].ToString();
269.             persnolity5 = r["field"].ToString();
270.         }
271.     }
272.     r.Close();
273.     string uid2 = "";
274.     string checkuser1 = "select Uid from profile2 where Uid =" + id.ToString() + ""';
275.     SqlCommand commm = new SqlCommand(checkuser1, conn);
276.     var rr = commm.ExecuteReader();
277.     if (rr.HasRows)
278.     {
279.         while (rr.Read())
280.         {
281.             uid2 = rr["Uid"].ToString();
282.         }
283.     }
284.     rr.Close();
285.     if (uid2.Trim() == id.Trim())
286.     {
287.         string update2 = "update profile2 set Hcode='" + persnolity2 + "',Description='" +
            persnolity3 + "',Job='" + persnolity4 + "',Majors='" + persnolity5 + "' where uid='" +
            Session["New"].ToString() + "' ";
288.         SqlCommand com5 = new SqlCommand(update2, conn);
289.         com5.ExecuteNonQuery();

```

```

290.     }
291.     else
292.     {
293.         string insertquery = "insert into profile2
(Uid,Hcode,Description,Job,Majors)values(@u,@h,@d,@j,@m)";

294.         SqlCommand comm = new SqlCommand(insertquery, conn);
295.         comm.Parameters.AddWithValue("@u", id.ToString());
296.         comm.Parameters.AddWithValue("@h", persnolity2.ToString());
297.         comm.Parameters.AddWithValue("@d", persnolity3.ToString());
298.         comm.Parameters.AddWithValue("@j", persnolity4.ToString());
299.         comm.Parameters.AddWithValue("@m", persnolity5.ToString());
300.         comm.ExecuteNonQuery();
301.     }
302.     conn.Close();
303. }
304. catch (Exception ex)
305. {
306.     Response.Write("error" + ex.ToString());
307. }
308. }
309. }

```