EMPLOYABILITY OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) GRADUATES IN NEPAL: AN EXPLANATORY SEQUENTIAL MIXED METHODS STUDY

Amrita Sharma

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AN ABSTRACT

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Title: *Employability of Information and Communication Technology (ICT) Graduates in Nepal: An Explanatory Sequential Mixed Methods Study*

ABSTRACT APPROVED BY

……..	……..
Prof. Tanka Nath Sharma, PhD	Assoc. Prof. Prakash C. Bhattarai, PhD
Thesis Supervisor	Thesis Supervisor

Employability, the attribute of securing employment and sustaining it, is an integrated concept that contributes to a sustainable and successful career span. Graduate employability is important in Information Communication Technology (ICT) because ICT is one of the major contributors to the economy of Nepal. However, the factors associated with graduate employability have not been explored and examined. Hence, this study explored the factors associated to employability, their levels, and the reasons behind the gaps in the view of both employers and graduating students.

The study featured an explanatory sequential mixed methods research conducted in two phases. In the first phase, a represented survey of 445 graduating students and 390 employers was conducted with a survey instrument constructed by the Delphi technique. Data were collected by using an online survey and analyzed through principal component analysis (PCA), descriptive statistics, and a t-test. The extent of employability was presented in a range from trace, emergence, present, and consolidation to optimization levels. In the second phase, a case study was carried out to explore the reasons behind the graduate employability gap among 7 graduating

students, 7 employers, 3 academicians, and 2 policy makers, all purposively selected, through in-depth interviews, and meaning was sought through thematic analysis. The results of both phases were merged in joint display and interpreted with the relevant literature, and human capital and social cognitive career theories.

The result of PCA followed by varimax rotation yielded three components with a total variance of 70.33%, core skills with 59.03%, personality attributes with 6.07%, and organizational adaptability with 5.21%. The result of the t-test showed that the employability of graduates differed in the views of graduating students and employers. Importantly, the components of employability had just emerged or were present and yet to be consolidated and optimized among graduates.

The results of the case study explored the reasons behind the graduate employability gap and identified the same as curriculum design, update, delivery, inadequate practicum, insufficient work-based learning, lesser engagement in extra-curricular activities, weak university-industry relations, and limited engagement of students in building employability skills. Relatedly, the proposed proficiency model for sustainable employment connects to building the competencies of graduates.

In conclusion, the broad ecosystem of industry and university ensures the competencies of graduates only when there is an opportunity to engage them fully during the ICT education journey as well as in re-skilling or up-skilling for employability. The insights provided by the study can be helpful to industry, universities, and policymakers to implement in their existing practices and build their commitment to the process of strengthening the sectors.

.....……. 5 February 2023

Amrita Sharma
Degree Candidate

This thesis entitled: *Employability of Information and Communication Technology (ICT) Graduates in Nepal: An Explanatory Sequential Mixed Methods Study* presented by Amrita Sharma on 5 February 2023.

APPROVED BY

……. 5 February 2023

Prof. Tanka Nath Sharma, PhD

Thesis Supervisor

…… 5 February 2023

Assoc. Prof. Prakash C Bhattarai, PhD

Thesis Supervisor

…… 5 February 2023

Prof. Mahananda Chalise, PhD

External Examiner

…… 5 February 2023

Asst. Prof. Suresh Gautam, PhD

Acting Head of Department

…… 5 February 2023

Prof. Bal Chandra Luitel PhD

Dean/Chief, Research Committee

I understand and agree that my thesis will become a part of the permanent collection of the Kathmandu University Library. My signature below approves the release of my thesis to any reader upon request for scholarly purposes.

…… 5 February 2023

Amrita Sharma, Degree Candidate

DEDICATION

To

All Paragons of Virtue

My Universe

Special thanks to

My Sweet Daughter Manasvi

My loving Father Arjun Dev Sharma Binadi and Mother Mridula Sharma Dhakal

My Caring Brother Ankur Sharma & Family

DECLARATION

I hereby declare that this thesis has not been submitted or published as part of any other degree candidacy.

……. 5 February 2023

Amrita Sharma

Degree Candidate

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Amrita Sharma

Degree Candidate

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ABBREVIATIONS

AGCAS	Association of Graduate Careers Advisory Services
BPO	Business Process Outsourcing
CACEE	Canadian Association of Career Educators and Employers
CAN	Federation of Computer Associations of Nepal
CET	Continuing education and training
CNI	Confederation of Nepalese Industries
CSIT	Computer Science and Information Technology
FNCCI	Federation of Nepalese Chamber of Commerce and Industries
FWU	Far Western University
GoN	Government of Nepal
HCT	Human Capital Theory
HEFCE	Higher Education Funding Council for England
IAEVG	International Association for Educational and Vocational Guidance
IBN	Investment Board of Nepal
ILO	International Labor Organization
IOE	Institute of Engineering
ITES	Information Technology Enabled Service
JET	Journey to Employment
KMO	Keiser-Meyer- Olkin
KUSOED	Kathmandu University School of Education
MMR	Mixed Method Research
MWU	Mid -Western University
NACE	National Association of Colleges and Employers

NAGCAS	National association of graduate career advisory services
NIRT	National Institute for Research and Training
NTIS	Nepal Trade Integration Strategy
PCA	Principal component analysis
PET	Pre-employment training
PMSE	Proficiency Model for Sustainable Employability
PU	Pokhara University
RONAST	Royal Nepal Academy for Science and Technology
SCCT	Social Cognitive Career Theory
SSDP	School Education Sector Plan
TVET	Technical and Vocational Education and Training
TVET	Technical and Vocational Education sector
USEM	Understanding, Skills, Efficacy Beliefs, and Meta-cognition

CHAPTER I

INTRODUCING THE STUDY

Employability plays a crucial role in reducing the number of unemployed information technology graduates. In this context, the major concern of this study was to explore and examine the notion of graduate employability in the information and communication technology (ICT) sector. Additionally, the underlying factors of graduating students and the ecosystem associated with employers and universities were examined. The existing gaps in ICT education and reasons therefor were explored, as explained by the participants in this study. This thesis begins with an introduction, followed by a literature review and research methodology. Based on the theoretical framework and methodological roadmap, this study derives the factors predicting the graduate employability of the ICT sector in Nepal, the level of employability of graduates, existing gaps, and the reasons therefor. The study ends with findings, some conclusions, and implications. In this chapter, the agenda of the study is introduced.

Introduction

Successful transition from universities to the industry is essential for graduating students. The success of the process in the liberal economy is determined by the success of the graduates entering the labor market (Vaaland & Ishengoma, 2016). In this process, the knowledge and skills of the graduates are valued by employers. However, in many cases, employers hardly find the required job attributes in the graduates. The ability to articulate what fresh graduates can offer the industry has been challenging (Blaquiere et al., 2019); and at other levels, all skills cannot be developed solely from higher education (Tran, 2016). In such a case, establishing a

relationship between education and industry is necessary, so that the stakeholders work collectively for equipping graduates with job attributes (Tymon, 2013). However, an initiative is hardly taken to consolidate the relationship. Consequently, a mismatch exists between the preparation of the graduates and the available job opportunities, which results in educated youths remaining unemployed (Yorke, 2006). During the review, this researcher noticed that employability has been an issue for investigation recently (Byrne, 2020). However, most of the global research on employability is theoretical and prescription-oriented (Dominguez & Gutierrez, 2019), with a lack of empirical evidence supporting the propositions (Tomlinson, 2017).

The concept of employability has been around for long, with the notion that graduates can contribute to the economy effectively after they become work-ready (Tomlinson, 2017). The discourse on employability in higher education was introduced formally in 1950 with its first publication on improving employability and the attitudes of difficult-to-place persons (Feintuch, 1955). Later, it evolved according to a different context. Though it has been developed and understood contextually, the basic idea in most contexts was the quality of becoming employable (Green et al., 2013). Graduate employability is also associated with the nature of work graduates get and the skills with which they perform. Therefore, with employability graduates develop the ability to obtain a job and function effectively, as well as accentuate the appropriate forms of individual competencies (Nielson, 2018; Yorke, 2006). Consequently, they can contribute to the knowledge economy.

Employability, or the attribute of getting employment, is considered very important in the present society. It is underpinned by the concept of competence, which involves a set of assumptions about graduate attributes and job requirements

(Velasco, 2012). In addition, employability constructs also differ as per the context and local determinants. Factors of employability are identified and explained as per the sociocultural and geographical contexts (Green et al., 2013). More importantly, each sector has fundamental prerequisites concerning graduate employability. Hence, there is a practice of understanding the constructs of graduate employability in the specific context and developing it as per the requirement of the context.

Identifying and understanding the constructs of employability requires an in-depth study. Mixed Method Research (MMR) strengthens the informed engagement of both qualitative and quantitative strands in the existing construct (Feter, 2018; Creswell & Clark, 2018) of employability and employment in the field of ICT. However, there is limited research, especially by applying the Mixed Method Research (MMR) design. There is a heavy reliance on case studies, which gave limited opportunities to extrapolate and compare the findings (Tymon, 2013; Clarke, 2017).

In the context of Nepal, employability has been discussed less (Karki, 2013) and is limited to linking the sociocultural aspects of employment opportunities. This concern is important in the context of Nepal, where long-term unemployment is high at 57.9%, which means getting the first job takes a long time after graduation (International Labor Organization [ILO], 2018). There is, thus, a growing discourse on skills related to the transition of the students from study to work, to fulfill the demands of industry (Law, 2018). This is the context to address youth unemployment as well. Sustainable economic growth, employment and decent work are also prioritized by sustainable development goals. Therefore, the mismatch between the educational preparation of graduates and the opportunities available in the job market is one of the major challenges to be addressed, considering the needs of the current

and future generations. The situation not only impacts the overall development of the country but can also result in the migration of numerous youths to low-paid jobs overseas. In some cases, the youths get involved in anti-social activities, including crimes. This is why the disjunction between education and industry and its consequences have always engaged me.

This researcher has observed the problem of mismatch while working in an international organization in Nepal. The researcher was the operation director, with additional responsibility for the human resource department. When she started analyzing the overall factors responsible for the mismatch between graduates and industry, she concluded that employability is one of the major contributors. The researcher observed that there has been no focus on employability skills in higher education. Employers too hardly engage in the effort to produce employability attributes in the younger generation. This has been a concern waiting for long to be addressed. Then she started exploring the construct of employability further.

Working on employability became the researcher's passion when she started working as a volunteer leader supporting a non-profit organization focusing on the economic empowerment of women. This researcher felt that one of her purposes in life was to contribute to promoting the employability of youth. Her passion for this area increased even more after she joined MPhil degree course and started to engage to examine worldwide concerns of "what" and "how" regarding employability. Knowledge and horizon of understanding the construct of employability reached the next level during her research journey. With this knowledge and experience, she started exploring it from the research perspective and engaged to promote the importance of employability in the changing context of Nepal.

To overcome such a situation of mismatch, the importance of Nepal's

competitiveness to align skills required by the market has been indicated by the development partners of Nepal, such as the World Bank and the Asian Development Bank. A highly skilled and highly productive workforce, with an emphasis on the interdependence among education, industrial policies, and the broader economy, not only supports the production of dedicated human resources in the area but also accelerates the overall economy of the country (Nepal Employment Policy, 2015). The concerns of employability have been prioritized in the Technical and Vocational Education sector (TVET). However, for the first time, the recent School Education Sector Plan (SSDP) focused on employability in higher education. Although the constitution of Nepal has equitable provisions, its essence has not been captured in policies and practices. The importance of proper investment and development of human capital to the productivity of technologies, change, and innovation (World Bank, 2019) has been emphasized. In the discourse, ICT has been presented as the sector to boost sustainable investment and accelerate productivity for comprehensive economic growth (IFC, 2019). Although the history of the ICT sector in Nepal is not long, as the establishment of Nepal telecom began in 1970, there was rapid development since 1971. This is pertinent as ICT is one of the fastest-growing sectors in Nepal and has great potential for continued growth in the future as well.

ICT and internet-based economy have been envisioned as major factors in equalizing players for small businesses and entrepreneurship for the sustainable economic growth of a country. In Nepal, the major focus in the ICT sector is on hardware support services, software and business process outsourcing services, cloud services, computer peripheral equipment, computer storage devices and servers, wireless telecommunication carriers, wired telecommunication carriers, communications hardware, satellite and telecommunication resellers, operating

systems and productivity software publishing, database, storage and backup software publishing, business analytics and enterprise software, video game software, design, editing and rendering software, artificial intelligence, and animation design. There are small, medium, and large-scale companies producing such products and services. Human resources are consumed mostly by small and medium-scale companies (Lemma, 2017). Although higher education in the ICT sector began in 1994 at Kathmandu University, currently, many colleges and universities provide higher education in the ICT sector in Nepal. Approximately 5,500 Nepalese graduates enter the ICT sector every year (IBN, 2016).

Besides, the continual improvement in telecommunications and internet infrastructures acts as a sector catalyst. As labor costs are increasing in India, Nepal is becoming an even more attractive ICT destination. ICT is considered a booming sector in Nepal, as many new ICT companies are entering the marketplace. Software developed in Nepal is not only consumed in the local market but is also exported throughout the world. This is evidenced by the recent trend of almost all ICT-related companies in Nepal having their company-specific software for daily operations (e.g., Nepal Telecom, NCELL, Daraz). The potential of borderless and weightless exports through ICT is also considered a potential goldmine for the country. However, employers and ICT graduates are also somewhat aware that the skill set ICT graduates have developed during their academic journey does not meet the industry requirements (Lemma, 2017). The importance of human capital formation and enhancing the competencies of ICT graduates has been a topic of frequent discussion. However, understanding the real situation of where our graduates stand and understanding the knowledge level of the graduates is lacking in the context of Nepal.

In such a scenario, there is a need to understand the factors that determine the

employability of ICT graduates as perceived by employers as well as graduating students. To address the need of promoting the employability of ICT students, it is important to study the articulation and analysis of the factors influencing employability and level from the standpoint of employers and graduating students. Additionally, exploration of the support ecosystem between employers and universities will help examination of specific cases in the ICT sector.

Research Problem

Education precedes employment, i.e., it provides graduates with an employment opportunity. It begets meritocracy, in which the individuals are selected based on their merits, talents, skills, and knowledge to regulate, control, and multiply economic goods and/or power, in government or non-government organizations. The levels and the types of education, however, are never closely 'matched' with professional positions and job requirements (Teichler, 2015). Such a situation often overturns economic benefits, reduces the productive dynamics of business organizations, and causes the loss of employers' trust or confidence in the novice newly appointed graduates in the organizations. The ICT sector is not exempt from such a situation. This sector is regarded as fast-growing and the mismatch of skills developed in schools with the requirement of industry is high (Yamada et al., 2020).

Generally, such deteriorating conditions in the field of ICT employment raise several questions. First, ICT education is questioned for its productivity in terms of the employability of its graduates. The key question being raised in this context is: why is the employability of newly produced ICT graduates not responsive to and/or coincides with professional requirements in the job market (ILO, 2021)? Second, the ICT curriculum designers in universities and the employers of ICT graduates are dissociated in terms of exchanging information and experiences for developing an

employment-friendly curriculum and/or application of the curriculum in the world of employment. Informing the curriculum designers of the expectations of employers in terms of employability of raw ICT graduates would contribute to ensuring congruence between employability (resulting from ICT education) and employment (in industries and/or business organizations). However, this agenda is still unexplored and hence requires academic investigation. Third, the universities, employers, and graduates have a tripartite relationship, especially in terms of employability and employment. This relationship has been weakened because of their non-responsiveness to such questions: To what extent has the university been able to impart employability to ICT graduates? What is the level of employability of ICT graduates, and to what extent does their employability respond to professional needs and requirements? What are the current needs of the job market and how does ICT education in universities match the needs and demands of the ICT job market?

The aforesaid problems in the field of employment, especially for ICT graduates in Nepal, often contribute to increased unemployment on the one hand and lack of quality human resources in the job market on the other hand. Human capital formation is critical for the acceleration of growth and reduction of poverty in Nepal (World Bank, 2019). It cannot be envisioned without adequate investment in the development of vocational and technical education (NPC, 2017). Investment in human resource development is essential at both personal and social levels. At a personal level, it becomes the means of economic development and, at the social level, it increases productivity and supports the process of social transformation (Sharma, 2015). Investment in human capital also contributes to economic growth. However, the present investment in the education system for labor productivity is inadequate (World Bank, 2019) and inefficient. Consequently, it hinders the

accomplishments of an individual in getting a job and being successful in the career path.

The ICT sector has been considered one of the major contributors to the development of the country, especially helping in employment generation for substantial numbers of unemployed youths. But, unfortunately, significant attention is yet to be accorded by researchers to the dimension of education mismatch between employers and job seekers in Nepal. Studies on employability in ICT connecting education and industry have not been conducted in the context of Nepal. The concept of employability in the ICT sector is yet to trigger interest. There are studies by development organizations and novice researchers, mostly focused on the importance of ICT, linking it particularly with specific sectors like education, health, industry, banking, etc. (Lemma, 2017; Kharel, 2018; Pant, 2013). It does not cater to the present need of analyzing the ICT sector from an employability perspective, considering the views of both employers and graduating students to explore the competencies and shortcomings of the sector.

Such a problem is not only limited to the world of employers and employment but also affects the economic growth of the country and the innovations in the industrial field. Conduct of this research was, therefore, a rather urgent requirement, for identifying strategies for responding to those problems. In the global context, the research on ICT sector's graduate employability is mostly inclined toward ICT as an additional skill over its dimensions (Picatoste et al., 2017), which is inadequate to explore the ICT sector from the graduate employability perspective. Furthermore, in analysis, employability research using Mixed Method Research (MMR) is found to be quantitative-oriented (e.g., Inceoglu et al., 2018) and qualitative inquiries are not studied in depth (Menon, 2016; Osmani et al., 2015). An in-depth exploration requires

an examination through quantitative measurement along with its explanation with detailed information from both employers and students, as the available knowledge on graduate employability in the ICT sector in Nepal is limited. The analysis of both quantitative and qualitative data that comes from a deep understanding strengthens the employability discourse with informed engagement.

Purpose of the Study

The purpose of this explanatory sequential mixed methods study was to explore the factors associated with graduate employability in ICT sectors, existing gaps and reasons behind the gaps incorporating the perceptions of stakeholders. In the first phase, factors, the level of graduate employability, and gaps were explored. This was followed up with multiple case studies to analyze the reasons behind the gaps as explained by graduating students, employers, academicians, and policymakers.

Research Questions

The study addresses the following three research questions:

1. What factors predict graduate employability as perceived by employers and graduating students in the ICT sectors?
2. To what extent do the levels of graduate employability as perceived by employers and graduating students in the ICT sectors differ?
3. How do employers and graduating students explain the reasons behind the existing gaps in graduate employability in the ICT sectors?

Hypothesis of the Study

Graduate employability in the ICT sector differs across graduating students and their employers.

Significance of the Study

Employability has not yet been a topic of high priority among students, employers, and educators. This research can be one of the milestone documents to propose a discussion on employment. Particularly in the ICT sector, it can fulfill the gap with the exploration of the concern of students and their employers regarding employability. Professionals working in the area know students' self-perception regarding what they have learned and what they can achieve in terms of employability. They also know the employers' expectations. This helps in the smooth integration of employability with the ICT curriculum and teaching-learning methods (Bridgestock et al., 2019) and supports graduates in overcoming economic, social, and psychological issues. This is also pertinent in the sense that the ICT sector is in transformation due to the rapid changes in technology. With these changes, expectations of ICT education as well as its graduates are also increasing. Out of the expectations, while technical skills and knowledge are primary, additional skills are needed to be employable (Pinto & Ramalheira, 2017). Therefore, the findings of the study can be applied to reform ICT education.

The study could support policy makers in formulating the policy on employability that may lend solid information to understand the scenario, expectation, and priority in building the capacity of human resources in the ICT sector. Employers can utilize the knowledge to support potential employability skills concerning this study. This might add a new dimension to labor regulations and strategies incorporating employability as a key for productivity in the ICT sector. The line agencies of the government and employers who are responsible for the improvement of ICT education can take this as a reference for their human resource development or capacity-building programs. Employers can also introduce many initiatives such as

probation period training, based on the level of competence of new employees (Oranzbayeva et al., 2021). The outgoing students can be benefitted and show their readiness accordingly after they are made aware of the factors associated with their employability. This can also help them to be prepared with the skills required in the job market. This study serves as a basis for future research opportunities in Nepal. It also provides an overview of ICT students' employability skills and actions that can be taken at the individual level to be employable.

Delimitation

To make the research specific, a delimitation was set, based on which the research was completed. In this study, the notion of employability was considered solely on the supply side (Nielson, 2018) and linked with education, and not guided by the demand side of the un/employment in the industry. For the selection of employers in the ICT sector, the data provided by the office of the registrar of companies with four codes were chosen. The code used at the company registration office for each category is 7210 (computer hardware), 7220 (computer software), 7230 (data processing, computing, communication, technology, outsourcing, all data base- related), 7240 (data services of finance, statistical, computer-related, online business, e-commerce), 7250 (service and repair) and 7290 (others). The study focused on the factors associated with employability in ICT, generated from the data from quantitative strands. However, in the qualitative strands, this researcher did not limit herself and explored the existing gap substantially to understand the wider context.

Operational Definitions

Some terms that are utilized throughout the study are defined due to the contextual meaning and complex nature of their usability. The meaning that is mentioned as follows is reflected in the most appropriate way in this study.

Employability: Employability is an integrated concept that contributes to securing employment and sustaining it (Yorke, 2006; Tomlinson, 2015)

Graduate employability: Employability of the fresh graduates who have completed the bachelor level in the ICT sector with a set of knowledge, skills, abilities, and attributes that make graduates more likely to get initial employment and be successful in their chosen careers (Bridgstock, 2009)

Factors: Components that are associated with the graduate employability of ICT graduates

Core skills: Core technical skills that enhance the major skills required to perform occupational tasks in the ICT sector.

Personality attributes: Skills that are developed over the time of an individual with the efforts of the individual, family and environment they are in.

Organizational adaptability skills: Skills set that are required for adaptability and sustaining employment by fresh graduates.

Graduating students: ICT students who are in the final stage of completing their studies. In three years' course, those students are in 6^{th} semester, and in the four year course, they are in the 8^{th} semester.

Graduates: ICT graduates who have completed bachelor-level education

Employers: Those who employ ICT graduates and are registered under six categories of ICT companies (Company Registrar Office, 2020)

Gaps: The variance between skills that organizations/industry need from the ICT employee and the skills graduates possesses/offer (Cappelli, 2015)

Competency: An individual's ability to understand a given topic or skillset, execute related tasks to a level of proficiency equivalent to that of an expert, and make decisions on that topic to support the lifecycle of related jobs (Austin, 2019).

Chapter Organization

There are seven chapters in this study. In chapter I, existing problems not addressed in employability concerns in the context of Nepal are explained and the context is set for the research with research questions and the significance of the study. It also explicates the reasons behind choosing the ICT sector for the employability of graduating students. In chapter II, related concerns and debates on employability issues are discussed and the theoretical framework is presented. The history of the development of the employability concept and several practices across different countries are also highlighted. In chapter III, the significance of dialectical pluralism for this study is explained, along with the philosophical paradigm. The chapter explains the "how" part of the thesis, along with detailed descriptions of the quantitative and qualitative phases of the study. It also presents the importance of joint display in mixed-method research.

Chapter IV presents the quantitative data. Three factors concerning graduate employability in the ICT sector are presented along with their levels, comparing it with the competency scale. The differences between the five-factor model of employers' perceptions and three-factor models of graduating students are analyzed at the item level, and gaps are explained, considering the similarities and differences in the local and global contexts. In chapter V, qualitative data are presented with an analysis in six themes. Themes were developed as a reason behind the existing gap

and discussed with the analysis of participants' views and existing literature. In chapter VI, the findings of the thesis are presented as a joint display. Additionally, discussions on the findings are presented in four major themes. A proficiency model for sustainable employability is presented and discussed in this chapter. Finally, in chapter VII, a summary and the conclusions of the study are presented. These indicate the existence of a gap while developing ICT graduates in Nepal. This section also highlighted the possible future research avenues on employability issues.

CHAPTER II

DELVING INTO THE DEPTH OF EMPLOYABILITY

In this chapter, a review of the literature related to graduate employability in general and the ICT sector, in particular, is presented. Related concerns and debates about their constructs are also discussed. Specifically, the literature related to the importance of employability, related policies, research, and examination of several stakeholders on employability ingenuities are discussed. The proposed theoretical framework of this study is also presented at the end of the chapter. Some contents of this chapter have been published in *Education Research International* as a title "Mixed Methods Research in Employability Discourse: A Systematic Literature Review Using PRISMA." And, accepted for publication in *Industry and Higher Education* is a section titled "Consolidation of Employability in Nepal: A Reflective Look."

Employability: The Notion and Constructs

Employability has been conceptualized through a range of understandings. However, the conceptual discussion was introduced in 1950 with the first publication of the formal note (Feintuch, 1955). Later, its learning reached several global contexts. The history and evolution of employability show some countries leading and others following and localizing the discourse as per their own contexts. The literature on employability, in general, offers a wide range of choices and compounding information, and there is no unified view of the term although attempts have been made. Though it has been developed and understood differently over time, overall, the notion signifies the aspects of learning benefits to a career beyond just the acquisition of attributes (Storen & Aamodt, 2010). To elaborate, graduate employability has been

portrayed as crude employment outcomes, alluding to developing competencies, pushing higher, and thinking broader. It has been accepted by governments as labor intervention, whereas it is the capability to secure a job with university-level education and the proactive management of one's career at a personal level (Yorke, 2010).

The theoretical aspects of employability are explained in different ways and are mostly contextual. When it is linked with employment directly, it is the supply side of employment integrated with education (Neilson, 2018). It is portrayed as input when connected with employment outcomes (Govender & Wait, 2017). Moreover, it can also be considered a university-work transition view over the learning view, when it comes to establishing employability. When it is considered from the neoliberal perspective, employability reflects more significant insights into how graduates develop and sustain the relationship with the labor market for their life-long careers (Tomlinson, 2017). Hence, it can be explained as an integrated and multidimensional concept that contributes to sustainable employment and a successful career at an individual level. Most scholars define it as the underpinning belief of where they stand. So, employability can be conceptualized as a construct built around individual, external and environmental factors.

In many cases, employability is explained as the synergistic combination of conceptual and empirical commonalities (Law, 2018). As these two often get changed, their constructs are dynamic and mostly contextual. Becker (1964) introduced the construct of employability with general, specific, and occupational skills. As it raised doubt with critics, Stevenson (1999) coined a new category known as “transferable skills”, an intermediate of general and specific skills. However, before Stevenson (1999) explained, Bridges (1993) linked the applicability of the

acquired skills with the cognitive domain. Other researchers like Hillage and Pollard (1998) categorized it into four main elements: personal, deployment, presentation, and priorities of action. Of these, personal attributes consist of reliability and integrity, motivation, problem-solving, team working, self- management; deployment comprises career management skills, job search skills, and strategic approach; presentation refers to presentable qualifications, references, track record, and interview technique; and priorities for actions. Unlike Hillage and Pollard (1998), some scholars perceived employability skills differently. For example, Smaldone et al. (2022) categorized employability skills into relevant and less relevant skills. For the author, relevant skills are verbal communication, learning, written communication, and problem-solving skills, whereas less relevant skills are numeracy and IT. This shows how employability is defined differently from individual to individual and their separate contexts.

To elaborate, Gonazalez and Wagennar (2003) classified it into instrumental, interpersonal, and systematic skills. McQuaid and Lindsay (2005) categorized employability into individual factors, personal circumstances, and external factors, with individual factors consisting of employability attributes, demographic characteristics, health and well-being, job-seeking adaptability, and mobility. Personal circumstances comprised household circumstances, work culture, and access to resources; and external factors consist of demand and enabling support factors. In addition, Yorke (2006) categorized employability into personal qualities, core skills, and process skills. Personal qualities include self-awareness, self-confidence, independence, emotional intelligence, adaptability, stress tolerance, initiative, willingness to learn, and reflectiveness. Core skills include reading effectiveness, numeracy, information retrieval, language skills, self-management, critical analysis,

creativity, listening, written communication, oral presentation, explaining, and global awareness, while process skills consist of computer literacy, commercial awareness, political sensitivity, ability to work cross-culturally, ethical sensitivity, prioritizing, planning, applying subject understanding, acting morally and coping with ambiguity and complexity.

In this connection, Kaushal (2016) identified twelve attributes of employability skills, viz., communication skills, teamwork, problem-solving skills, initiative and enterprise, planning and organizing, managerial/leadership skills, interpersonal skills, adaptability or flexibility, creativity or innovation, negotiation skills, commercial awareness, and lifelong learning. Cumming (2010) proposed the employability framework of the Government of Australia and listed the relevant employability attributes as communication, teamwork, problem-solving, initiative and enterprise, planning and organizing, self-management, learning, and technology. Other scholars explained employability skills as competencies-e.g., Kavanagh and Drenan (2008) divided employability into two broad categories of competencies: functional and personal.

Garcia and Rolf (2008) explored six skills through factor analysis, viz., organizational, specialized, methodological, generic, participative, and socio-emotional. Organizational comprises the ability to work under pressure, autonomy, and attention to detail; specialized refers to the performance of activities and tasks in own field of work; methodological deals with problems and solving them; generic consists of critical thinking and oral and written communication skills; participative encompasses planning, decisions, and responsibility and socio- emotional includes interpersonal and team working. In a similar study in India, by using factor analysis, scholars explored four factors of employability–core employability skills,

communication skills, professional skills, and data analysis and interpretation. Core employability skills comprise generic, attitudinal, affective skills, reliability, and teamwork; communication skills include English skills, written and verbal communication and professional skills refer to cognitive skills, application of knowledge; data analysis, and interpretation (Blom & Saeki, 2011). In another study carried out among 982 graduates, two factors were explored–personal qualities (enthusiasm, hard-work, dedication, and personality) and interpersonal skills (teamwork) (Velasco, 2012). By reviewing these studies, the researcher realized that each study yields different factors. The number of factors also differs among studies. However, all studies ended up exploring the skills necessary for students.

Some other studies were carried out to categorize the factors. For example, Hamburg and Rolf (2015) categorized employability into professional expertise and interpersonal skills. In the studies, the relevance of the factors was highlighted. For example, in a study carried out among 600 graduates in Nigeria, Pitan (2017) emphasized the importance of personal attributes and career guidance as the structural determinants of employability. Such studies have been carried out in many sectors. For example, Chen et al. (2018) studied employability among maritime business graduates. The skills explored in the study were communication, problem- solving, adaptability, self-management, team-work, digital literacy, and technology. In Nepal, this researcher explored factors associated with engineering students and uncovered five major attributes: personal attributes, core attributes, process attributes, self-management, and career guidance (Sharma, 2019). The details of literature matrix of graduate employability and factors associated with it are presented in Annexure VIII & IX. The literatures show that employability constructs differ depending on the context. However, it is important to understand its development to support students.

Employability skills and attributes are also identified in the context of a country or the context of the sector, such as management, engineering, accounting, IT, etc.

Employability Discourse in the International Arena

The discourse of employability in higher education is not new. With the first publication of the formal note, the conceptual discussion was introduced in 1950 (Feintuch, 1955). In 1960, the concept was reinforced to serve the interest of the underprivileged and unemployed, especially to mainstream them in the formal labor process. The positive attitude toward formal work improved much in the decade, which boosted the image of formal employment (Chickering & Gamson, 1987). It was a significant shift in employability. Consequently, the concept of full employment emerged in the discourse of employability. In the discourse, knowledge, and skills were prioritized for economic necessity (Chickering & Gamson, 1987). In 1980, knowledge and skills were tied to the strategies for human resource development. Human resource instruments were introduced in the decade (Ever et al., 1998). Similar terminologies and debates were brought into the discussion (Bennett, 2018).

In the 1990s, the notion of employability was combined with job security. This linkage broadened the concept of employability, which was previously limited to entering the workplace (Forrier & Sels, 2003). With this change, the work horizons of the employees were broadened, and they started to move beyond the borders of limited employers. Consequently, employability was accepted as an essential instrument of the labor market (Ever et al., 1998). In 2000, there were significant shifts in the employability discourse. Scholarly discussions were held, with broad interpretations. The concept of the psychological contract between employers and employees was established, which maintained internal and external labor markets (Harvey, 2001; 2005). Additionally, employability was considered a movement

capital that helped employees in career progression. With this, additional models were proposed (Kwok, 2004; Denny & Reid, 2005), and employability was considered an indicator of quality education. Considering that pedagogy was connected mainly to higher education policies (Nielsen, 2018), several universities-initiated projects in the same area. In measuring institutional performance, the agenda of employability was considered (Mcllveen, 2018; Nielsen, 2018).

In 2010, the employability discourse was not limited to developing the personal ability to get employment; it was extended to enhancing lifelong learning (Boden & Nedeva, 2010). Career capital was acknowledged, and the curriculum was integrated into higher education (Mcllveen, 2018; Nielsen, 2018). It empowered graduates to be innovative and critical in their perspectives (Mcllveen, 2018; Nielsen, 2018). With this, employability was accepted as a continuous learning process in the different stages of an individual's life. The concept gained acceptance and recognition in several developed countries in the decade. The notion now signifies the aspects of learning that benefit one's career, beyond the acquisition of attributes (Boden & Nedeva, 2010; Tymon, 2013; Storen & Aamodt, 2010; Yorke, 2010). At present, employability has been integrated into the higher education system of many countries and considered an integral part thereof (Schaper, 2020). The historical development of the employability discourse is presented in Table 1.

Table 1

The Idea of Employability and its Development

Timeline	Development	Milestone document
1950s	Formal employability discourse initiated with this first publication	Feintuch, 1955
1960s	Underprivileged, unemployed people in the labor process mainstreamed	Chickering and Gamson (1987)
1970s	Knowledge and skills for economic necessity (i.e., concept of full employment) introduced	Chickering and Gamson, (1987)
1980s	Employability introduced as coping strategy for human resource development; employability as H.R. instrument; debates on terminology and concepts begun	Bennett (2018); Ever et al. (1998)
1990s	Employability as a labor market instrument	Ever et al. (1998)
2000s	Concepts and models introduced: employability as movement capital; employability models; employability as an indicator of quality education and teaching-learning as well as university projects, measuring institutional performance. Employability integrated into country policies/ higher education policies	Deny and Reid (2005); (Forrier & Sels, 2003; Harvey, 2001; Harvey, 2005; Kwok, 2004; Mcllveen, 2018; Nielsen, 2018)
2010s	Employability skills introduced as tools for life-long learning; career capital; mainstreaming in higher education via curriculum development; developing graduates as critical and empowered learners; employability as a continuous process in different stages of life	(Boden & Nedeva, 2010; Mcllveen, 2018; Nielsen, 2018; Tymon, 2013; Yorke, 2010)
2020s	Employability discourse integrated into higher education; expansion of the concept in different countries; employability not as an option but an integral part of higher education	(Mgaiwa, 2021; Sambell et al., 2021; Schaper, 2020)

Several models of employability were introduced along with the discourse. For example, Knight and Yorke (2002) presented a USEM (Understanding, Skills,

Efficacy Beliefs, and Meta-cognition) model. However, the model did not emphasize practical aspects and overstressed soft skills. The model is still considered a milestone in the employability discourse because it was proposed with a solid foundation. Another model, called the Career Edge Model of Employability, focused on the practical aspects with the three psychological constructs: self-efficacy, self-confidence, and self-esteem (Pool & Sewell, 2007). However, the model is considered weak because it lacks enough studies and depth of information/data (Govender & Wait, 2017). The next model which the literature proposed was Journey to Employment (JET). It helps to understand the journey of young graduates from their studies to employment. The framework is useful for employers to understand and measure employment outcomes (Copps & Plimmer, 2013). Though none of the above-mentioned models fits in the socio-cultural context of all countries and their programs, some examples can be taken as a reference to examine what works for the specific context. For instance, Canada has the best practice of Dalhousie Career Portfolio (Wright, 2001). This multi-faced program aims to support students in comprehending the value of learning, knowledge, and skills in their career development.

Importantly, several countries have had best practices for employability. Among them, the practices of six countries—the United Kingdom, Australia, the United States, Canada, Malaysia, and Singapore—and some European countries have been emphasized in the literature. These practices are presented in Table (2).

Table 2

Practices and Implementation in Different Countries

Countries	Introduction to unique practices	Documents
The United Kingdom	Career advisory staff; Higher Education Academy's Enhancing student Employability Coordinating Team (ESECT); extensive integration of work-based learning into the course; the U.K. Commission for employment and skills; Government contribution to funds like the Higher Education Funding Council for England HEFCE (economic challenge investment funds); graduate talent pool; graduate skill award (university level practices); more than 69% of institutions incorporate employability-focused curriculum/extracurricular activities	(AGCAS, 2020; Chickering & Gamson, 1987; Knight & Yorke, 2002; Tomlinson, 2016; Yorke, 2010)
Australia	Knowledge-based economy; well-established employer-institution relationship; National association of graduate career advisory services (NAGCAS); Australian Higher Education Workplace Skills Olympiad	(Barrie, 2004; Bennett, 2018; Deny & Reid, 2005; Franz, 2008; GCA, 2020; HECSU, 2020; Knight & Yorke, 2002; NAGCAS, 2020)
Across Europe (Finland, Poland, Germany, the Netherlands)	European Alliance on skills for employability; career week in the Netherlands; federal and state government initiation on internet portal in Germany; university initiations to help students find internships and jobs; workshops are organized in Finland to support students; employers' engagement, free workspace, and resources for students; facilitation for entrepreneurs/startups to develop their businesses	(Bendixen & Jacobsen, 2017; Muldoon, 2009; Raban, 2006)
The United States	National Association of Colleges and Employers; publishing professional standards for colleges and universities career services; robust framework throughout the country;	(Bargsted, 2017; CACEE, 2020; IAEVG, 2020; Knight & Yorke,

	involvement of alumni association; career Fair	2002)
Canada	Canadian Association of Career Educators and Employers; the Canadian career development foundation; integrated curriculum from school level; student-focused support	(Bennett, 2018; IAEVG, 2020)
Malaysia	Employability to reduce unemployment in the country; Malaysia Education Blueprint 2012 to 2015; pioneer 2u2i; involvement of industry in an academic program; mentoring work-based learning program; initiations by universities for creativity and innovation; not-for-profit initiatives to support employability; involvement of chambers;	(Yusof & Jamaluddin, 2015)
Singapore	Pre-employment training (PET); continuing education and training (CET); funding mechanism by skills development levy and life -long learning endowment funds operated by Singapore workforce development agency (WDA); skill Future: a national movement; inclusiveness for old vulnerable, disabled workers; ISEAS-Yusof Ishak Institute.	(Loke & Gopinathan, 2017; Nielsen, 2018; Schaper, 2020)

With the ideas presented in Table (2), this researcher realized that among the countries, the United Kingdom and Australia are leaders in integrating employability skills in the pedagogies of their higher education. Particularly, most U.K. institutions develop their own strategies to enhance the employability of students. The career advisory staff and Student Employability Coordinating Team (SECT) are also engaged in the process. In many programs, work-based learning is integrated. To support that, the Higher Education Funding Council for England (HEFCE) funds initiatives such as economic challenge investment funds. In addition, practices of graduate talent pool help students prepare for industry. Besides such support programs

from the government, there are adequate practices at the university level (e.g., Graduate Skill Award) (Tomlinson, 2016). The best U.K. practice is that more than 69% of academic institutions incorporate employability-focused curricular / extracurricular activities (Knight & Yorke, 2002; Yorke, 2010).

In Australia, the government operates a knowledge-based economy for students' employability. Consequently, cordial relationships have been established between employers and university human resources (Knight & Yorke, 2002). A meaningful engagement of employers from curriculum development to skills development of the graduates can be observed in many countries, which plays a significant role in employability (Barrie, 2004; Denny & Reid, 2005; Franz, 2008; Graduates Career Australia [GCA], 2020; Higher Education Careers Services Unit [HECSU], 2020; Tomlinson, 2016). On top of this, the establishment of the National Association of Graduate Career Advisory Service (NAGCAS) has supported students in taking up innovative initiatives that develop employability skills (NAGCAS, 2020). In addition, organizations such as the Australian Higher Education Workplace Skills Olympiad provide an opportunity for learners to prepare for their career journeys (Bennett, 2018).

Finland, Poland, Germany, and the Netherlands are other countries that are in the phase of integrating employability in their education systems. In the Bologna Process, several initiatives across Europe were taken to enhance employability skills, targeting the labor force entering the job market (Muldoon, 2009). Here, the European Alliance on Skills for Employability is dedicated to developing the skills required for industries. A competitive career is given importance in the systems. For example, the Netherlands holds a career week; the federal and state governments in Germany facilitate an internet portal having career information; internships, job workshops, free

workspace, and entrepreneurial support are provided in the universities of Finland (Bendixen & Jacobsen, 2017; Raban, 2006).

The United States has a more centralized and robust framework implemented throughout the country, with an established professional standard for colleges and universities to support career services (International Association for Educational and Vocational Guidance [IAEVG], 2020). Universities make efforts for career development and provide adequate information to graduates to support them in the search for relevant employment (Knight & Yorke, 2002). Career preparation activities are primarily integrated into the university system. The alumni association is also involved in career development activities. The National Association of Colleges and Employers significantly contributes to the employability of graduates (NACE, 2020; Bargsted, 2017). In addition, the U.S. Commission for Employment and Skills ensures the integration of employability in education (Association of Graduate Careers Advisory Services [AGCAS], 2020).

Canada has integrated employability education into the school-level curriculum. The employability education at the foundation plays a significant role in developing relevant skills among students (Bennett, 2018). In addition, student support for employability is key in every educational institution in the country. Importantly, the Canadian Association of Career Educators and Employers and the Canadian Career Development Foundation play a vital role in bringing forth initiatives for employability (Canadian Association of Career Educators and Employers [CACEE], 2020; IAEVG, 2020).

Malaysia has also taken important initiatives to enhance employability skills, targeting people entering the job market. For example, the Ministry of Higher Education has prioritized employability as a critical agenda/intervention to reduce

unemployment. Malaysia Education Blueprint 2012–2015 provides directions on developing employability among graduates. In addition, pioneer activities from non-profit organizations such as 2u2i have supported the active involvement of industry in an academic program and mentoring work-based learning (Yusof & Jamaluddin, 2015). There are some noteworthy initiatives by universities to encourage and support the creativity and innovation of graduates (Yusof & Jamaluddin, 2015).

Singapore is an example of inclusive employability. Skills Future is a national movement that addresses the issues and concerns of old, vulnerable, and disabled workers and their workplaces (Schaper, 2020). Singapore Workforce Development Agency (WDA) operates Pre-Employment Training (PET), Continuing Education and Training (CET), Skills Development Levy, and Life-Long Learning Endowment funds for a competitive and employable workforce (Loke & Gopinathan, 2017; Nielsen, 2018). These initiatives are considered milestones to promote employability skills in Singapore. Countries like India and China are also progressing with some innovative soft skills and work-integrated learning projects. However, employment and employability have not been distinguished at the intervention level (Khare, 2014).

Employability Discourse in Nepal

The history of formal education and formal employment in Nepal is not long. Informal education and informal employment were significant parts of Nepalese tradition and culture. Traditionally, the education system was hierarchical and hegemonic, in which teaching prevailed with only a guru to be followed (Koirala, 2018), although adequate opportunities were provided in many cases to the students to interact with the teachers. Nevertheless, the gurukul systems with learning from the teachers, such as monks and priests, existed for a long time. The renaissance of Nepali arts, education, and architecture happened in the Lichchhavi and Malla periods (the

11th and 12th centuries); however, formal employment was beyond their vision then. However, for employment, there were practices of professional hierarchy through the division of labor with categorization as *Brahmins* (priests), *Kshatriyas* (warriors), *Vaishyas* (skilled traders, merchants), and *Sudras* (service providers), with a specific occupation that was determined by birth (Kautilya, 150AD/1992). At that time, one's career was mostly guided by one's birth and, thus, was transferred from one generation to the next. The caste-based divisions were formalized through *Muluki Ain* (the National Legal Code) in 1854. The caste system introduced a hierarchy in the society from the top to the bottom and, at the same time, provided professional occupations from the birth of an individual.

The formal education system was established during the Rana period (Manandhar, 1993). Jung Bahadur Rana was influenced by Western education and established Durbar High School as the first school in Nepal in 1853 (Gurung, 2012), which is considered to have pioneered modern education in Nepal. Likewise, *Shrestha Pathshala* (Clerk School) was opened in 1905 to address the need for clerical jobs of that time. Writing, arithmetical calculation, legal provisions, and government procedures were the matter of study in the school. At that time, education and employment in civil service were introduced in practice for those close to the rulers. In 1918, Trichandra College was established, considered a milestone in Nepali higher education.

After the establishment of democracy in 1951, formalized mass education and industrialization progressed in Nepal. Consequently, more employment opportunities were created in the industrial sector than in the agricultural sector. In other words, with the socio-political changes in the country, both education and employment were considered to uplift the local context, and some activities were initiated along those

lines. The first university, Tribhuvan University, was established in 1959. The National Educational System Plan 1971 was introduced as a single unified document for education. After restoring multi-party democracy in 1990, Nepal was largely opened up to other parts of the globe. In 1992, the Labor Act was passed, followed by the Trade Union Act in 1993 and labor rules in 1994.

The country's Constitution (Nepal Law Commission, 2015), the National Development Three-Year Plan (2014/15 to 2019), the Education Act (1971), and the School Sector Reform Plan (2009–2016) commit to the equitable provision of quality education linked to employment. For the first time, the recent School Education Sector Plan (SSDP) 2021–2030 focused on employability by education. In the document, the need for linking the education sector to the labor market is highlighted. It also discusses developing students' skills for future career opportunities. The Nepali Government has initiated several policies and strategies for industrial development in Nepal. Regarding employment promotion, several measures have been suggested in the National Employment Policy 2015 and the Labor Act 2017. In addition, the Technical and Vocational Education and Training (TVET) sector has highlighted the need for employability with its reform. Collaboration and co-creation of employment opportunities and re-engineering of the education sector for skill development are included in the TVET development discourse (Lamsal, 2021). TVET policy, 2012, and TVET skill development policy, 2007 have highlighted the importance of employability (Poudel, 2020). However, the National Education Policy, 2019 remains silent on the agenda. No documents or policy papers trace a proper linkage between industries and academic institutions to promote employability among graduates in Nepal. If we look at policies in the ICT sector, such as the Telecom Policy, 2003, Electronic Transaction Act, 2007, and ICT Policy 2010, human capital development is

not prioritized (Bhattarai, 2021). The Government of Nepal (GoN) also selected an ICT and digital Nepal framework to align with the vision of Prosperous Nepal and Happy Nepalis. The GoN also formulated a new ICT policy in 2015, aimed at creating a favorable environment for sectorial growth and enabling a digital ecosystem in Nepal, which too does not speak about human capital development and employability implicitly.

Education in Nepal is questioned for its quality, as it does not cater to employment benchmarks. Unemployment and underemployment are significant issues to be solved in the present context. Some policies and documents have guided work-based education at a higher level. However, it has not yet been prioritized in practice (World Bank, 2013). Thus, it is clear that the mismatch between demand and supply is due to the absence of proper need assessments, traditional supply-driven courses, and a conventional delivery approach. Fewer opportunities for practical exposure and inadequate career guidance and counseling system are other causes of the consequence (National Institute for Research and Training [NIRT], 2016; Bhattarai, 2009).

Various practices in Nepal reflect the poor linkage between academia and industry. For example, there is an inadequate linkage between employers and universities in Nepal. Koirala (2018) opines that with some exceptions of internship, work placement, and career advice services, all universities in Nepal have very weak coordination and collaboration with industry. Although some initiatives of engineering and management colleges are commendable (Bhattarai, 2009; Pahari, 2011), most of these do not focus on work-based learning; rather, they engage in minimum industrial participation. Consequently, there is a lack of opportunities to enhance the employability of graduates. In other words, the platforms that expose

graduates to today's dynamic working environments are limited. This situation raises questions about the quality of the future workforce.

The above situation does not mean that the education and employment sectors are not growing. They are progressing at their own pace. However, collaboration and coordination, which should have been present between the sectors, are missing or weak. Meaningful representation in delivering relevant education or creating work opportunities for graduates is not yet a priority of industries (Paudel, 2019). In addition, there is a lack of proactive engagement between university graduates and the stakeholders of the corporate sectors in Nepal. This inadequate engagement puts the university's activity and the industrial culture in question. In this context, learning from the scholarly discourse and the international best practices can address the need to integrate employability into Nepal's educational and industrial sectors.

Employability in ICT sector in Nepal

The history of the ICT sector in Nepal is not so long. Communication used to be mostly by short wave radio and telex service, before 1970. After the establishment of Nepal Telecom in 1970, the development of the ICT sector began in Nepal. Another milestone was in 1971 when ICT was used for processing population census data for the first time. Thereafter, in 1974, an electronic data processing center was established. After 1982, there were joint venture initiatives from the private sector with the inception of Data System International Pvt. Ltd. In 1993, the Royal Nepal Academy for Science and Technology (RONAST) started to use internet service with access for limited people. In 1994/95, IT-related equipment and services were made available to the general public. The ICT sector was considered the driving engine for the country's economic growth. In 1994, a private company called Mercantile Pvt. Ltd introduced the internet service for the general public. With all these efforts, from

1995 onwards, access to the internet and email connectivity increased in the country. This required group of human resources was dedicated to building careers in the ICT sector.

Considering the importance of human resources development in the ICT sector, Kathmandu University established a higher education program in 1994. Tribhuvan University started its programs related to the ICT workforce in 1998. Though the ICT sector has been considered the vehicle of robust growth in the country, its workforce development is still not a priority. There are prospects of adopting a strategy for making Nepal an integral part of the global digital ecosystem. However, it is noteworthy that Nepal has already been an integral part of the digital value chain through BPOs, ITES, digital labor platforms, and thousands of Nepali diaspora working globally (IBN, 2016). Although the government is keen on developing the ICT sector and facilitating greater access to foreign investment, there is still a lot to be done in this regard on a sustained basis (Bhattrai, 2021). Advancements in the ICT sector and the speed of digitalization worldwide have opened up unprecedented opportunities for youth to join the global workforce and become part of the global value chain. Therefore, facilitating the development of ICT graduates, skilling students, and facilitating their placement will be of great help in transforming the country's socio-economic structure.

While reviewing the thrust of vision, mission, strategy, and some of the key highlights in the policy documents of Nepali universities (IOE, 2019; School of Engineering, 2016; MWU, 2018; FWU, 2019; PU, 2019; Purbanchal University, 2019), This researcher sensed that the need for practical skills and employability are the key concerns of the universities. Although the terminology “employability” is not mentioned anywhere and the work-based learning requirement of technical education

has not been incorporated in the curriculum, the expected outcomes of the education reflect the need for skills and connection of education to the industries, development of personal attributes, and hands-on experience, which are some of the attributes of employability.

The Institute of Engineering, Tribhuvan University, has envisaged its graduates developing world-class competence by providing quality ICT education focusing on market-relevant programs, enhancing cooperation and collaboration of academia with industry (IOE, 2019). It has hinted at quality education and highlighted the need for an effective examination and evaluation system. Its values and goals point out the competencies of students, capacity building, practical experience, and international collaborations (IOE, 2019). Correspondingly, the Kathmandu University School of Engineering is envisioned to become a world-class university and has a vision of quality education for leadership (School of Engineering, 2016). It has its streams of computer engineering and computer science. Additionally, it uniquely highlights nurturing application as well as developing the students' abilities and personalities, along with academic excellence. The Mid-Western University School of Engineering, comparatively a new institution, focuses on access to higher education in remote areas, with quality education as one of its major highlights (MWU, 2018). Besides accessible higher education, nurturing innovation and academic excellence are the focal areas of the University's School of Engineering (FWU, 2019). This shows that ICT in Nepali universities is connected with engineering education and its development.

Pokhara University Faculty of Science and Technology presents quality education in its vision, mission, and strategy with research-oriented engineering education. Hitech skills and profound ethical values capable of unfolding potential

and creativity, innovation, and competencies for the 21st century are also highlighted (PU, 2019). It emphasizes quality education with extensive practical sessions with technical experience. It has also designated the faculty of science and technology as the center of excellence for higher education by enhancing teaching, learning, and research activities and supporting the nation's development by producing job market-driven, responsible, productive, welfare-focused, and committed human resources (PU, 2019). Similarly, Purbanchal University School of Engineering and Technology has a vision of quality education to meet the national and international needs of the engineering profession. It aims to address the problem of unemployment with practical studies and academic excellence. It further stresses the abilities and personalities of students, teachers, and scholars (Purbanchal University, 2019). This shows the importance given to ICT education by academic institutions to support fresh graduates. The act, strategies, and priorities are for preparing capable human resources. However, their implementation on the ground is being questioned, given the high percentage of educated unemployed (Lemma, 2017).

The modern economy and the fourth revolution process have proved the usage of technology for economic development globally. It has become more pertinent in this age of uncertainties. ICT has been considered one of the emerging sectors for economic development in Nepal as well. However, the contribution of the ICT sector is hardly linked to the process of policy formulation in the area of employability. ICT has been appreciated for employment promotion, but it is limited. The Nepal Trade Integration Strategy (NTIS) has identified Information Technology Enabled Service (ITES) and business process outsourcing (BPO) as one of the five priority export potential services. The export revenue from ITES and BPO in 2013 was approximately US$ 3,572,905 (IBN, 2016). Besides, the GoN has also selected ICT

and digital Nepal framework to align with the vision of Prosperous Nepal and Happy Nepalis. The GoN also formulated a new ICT policy in 2015, aimed at creating a favorable environment for sectoral growth. Although there are some initiatives related to the ICT sector, the collaboration of state agencies with employers of ICT sectors is often debatable. An adequate connection relating to the employability concept is often not a priority. Besides, linking the initiatives with universities is beyond conception.

Linkages between Industry and Academic Institutions for Employability

It is essential to update technical education to impart 21st-century skills and produce life-long learners for a creative and innovative society (Law, 2018). It contributes to skill enhancement, supporting each student to be in their best form, to do the best job, or create opportunities for others (Bhattarai, 2009). The current situation expects practical experience through hands-on exposure in business and industries. Employers value innovation, adaptability, and resilience to cope with the uncertainty of the market (Owens & Tibby, 2014). However, academic institutions are still developing content-loaded curricula (Ehiyazaryan & Barraclough, 2009) following traditional methods and carrying the same course of study for a long time, with a few exceptions (Gill, 2018) relating to the development of students' skills in some countries.

ICT education is anticipated with additional skills along with an academic degree. An academic institution is expected to guide students from the beginning about their strengths and weaknesses and provide guidance to select program areas of their interest, ability, and aptitude. The idea further asserts that the involvement of industry in the process, from curriculum design to providing practical exposure, is discussed largely. It gives importance to employers' engagement with course design as well as providing information and work exposure (Vaaland & Ishengoma, 2016;

Cox & King, 2006). The linkage between industry and academic institutions is important. For this, Etzkowitz and Leydesdorff (2000) presented the linkages in their Triple Helix model with the explanation of interaction among the government, industry, and universities, to increase employability.

Academic institutions can be proactive and work together with employers and the government to increase the number of employment opportunities for educated youth. To complement this, the industry can also take initiatives to support academic institutions and the government to understand the existing gaps in the supply-demand situation (Husain et al., 2010). This supports the academic institution to consult and engage employers in the process of education for more realistic and appropriate academic teaching-learning preparation and corresponding practices (Saad & Kay, 2014). Through this, actors may come together to resolve the bigger issues of unemployment by imparting practical skills to students and curriculum reforms, which help to minimize the problem of work-education mismatch. The national expectation from ICT education for the development of the country is higher than from others. Thus, the employability of ICT graduates can be enhanced to meet the market expectation, with additional employability strategies (Abdrewartha & Harvey, 2017). A close connection between ICT education providers and labor market partners can be one of the solutions in this regard. Investment in the area yields the outcome of employability (Pons, 2013). Curriculum reform and human capital resources are other areas for investment.

Exploration of Employability: A Methodological Lens

While reviewing the literature, this researcher noted that employability research has been dominated by quantitative research methods (e.g., Inceoglu et al., 2018). Most of the studies (such as Rahnuma, 2020; Kossek & Ollier- Malaterre,

2019) have used surveys and comparative analyses. Comparing and contrasting the models used across these studies, cross-sectional and longitudinal data were found to be commonly used for quantitative methods in employability research. Similarly, calculating employability rates, ranking the university, measurement of skill-based learnings and competencies, conceptual specifications analysis, and analysis of indicators of employability are common practices associated with quantitative studies on employability (Harvey, 2001).

Despite quantitative domination in employability studies, there is also an increasing trend to use qualitative inquiry in this field. The qualitative method enables an understanding of the underlying reasons (Menon, 2016) and has helped to uncover grounded meaning within the notion of employability. It further enables understanding the perceptions of the various stakeholders about employability (Osmani et al., 2015). The perceptions are captured mostly to comprehend in-depth beliefs and their underlying reasons.

Each research method has its strengths and inadequacies. For instance, quantitative research lacks an understanding of specific settings. With quantitative research, the questions of 'What?' can be answered; however, responding to the questions of 'Why?' and 'How?' needs a more comprehensive understanding. Additionally, there are challenges and potential limitations in qualitative research, as in quantitative research. In such a situation, when research questions demand both aspects, the mixed method design can provide a strategy to examine the notion of employability, considering the strengths of each research method.

There are several examples of the use of mixed-method research (MMR) in employability studies. The strengths of an MMR design in the context of employability and higher education have been explained in several studies. For

example, Nam and Kim (2019) used MMR to obtain complementary results, gaining the strength of both quantitative and qualitative strands to arrive at the full concept of employability. Similarly, it was used to investigate issues through both open-ended and close-ended questions, for understanding the depth of the employability construct. Moreover, the integration of the approaches was seen as a significant strength to complete sophisticated analyses of complex research questions that result in the confirmation of hypotheses (Pendrix et al., 2012). Additionally, MMR approaches are used for pragmatic advantages while exploring a complex research question. Likewise, Synard and Gazzola (2017) used MMR for the inductive derivation of factors to explain the relationship provided by the participants. Meanwhile, another group of researchers used MMR for validation (Fearon et al., 2020). Such examples help us understand the importance of MMR in the employability discourse. MMR also makes a valuable contribution to the research and strengthens the theoretical discussion (Johnson & Onwuegbuzie, 2004). It generates a better understanding than either quantitative or qualitative method alone (Creswell & Clark, 2018).

Interpretations from MMR studies can be traced to support students, education providers, and institutions to understand and explain the complex phenomenon of human capital development (Bennet, 2018; Bridgstock & Jackson, 2019; Vaaland & Ishengoma, 2016). Furthermore, they provide an opportunity for deep and broad analysis (Ivankova, 2006), particularly of higher education and work-education transition. The researcher can find additional insights by merging the results of the qualitative and quantitative strands (O'Cathain et al., 2007). Researchers who deal with the complexities of engaging with the education and employment linkage may experience challenges but can also contribute to a broader purpose of higher education

that goes beyond economic development (Bennet, 2018; Tran, 2014). Therefore, meaningful research with additional insights can promote knowledge in the economy.

The quality of evidence and rigor of MMR adds value to emerging research areas like employability. Furthermore, the integration of data provides endless possibilities for analyses and statistical interferences (Fetter, 2018). Moreover, it supports confirmatory and exploratory research questions, generating more robust, credible inferences and divergent viewpoints (Teddlie & Tashakkori, 2009). With such strengths, there is an increasing trend of using MMR in the employability discourse as it contributes explicitly and implicitly to understanding the employability construct. Following the trend, the researcher decided to use MMR in this study.

Research Gap

The review of the existing literature indicated that the factors of employability are to be examined and explored in an attempt to support the successful career of graduates. This requires a comprehensive study of the same. However, such studies are not available in the context of Nepal. There are a few research studies (e.g., Pant, 2013) on employment linked with gender, ethnicity, and migration issues, but they hardly cover the understanding of the entire notion of employability. In relation to the ICT sector, there are some studies (e.g. Kharel, 2018) that emphasized the competencies required for the sector. Additionally, some studies on the ICT sector are dedicated to harnessing its benefits by linking it with education, health, banking, and employment. However, studies on employability connecting to universities and the job market have not been conducted yet. The emerging and critical areas that need to be addressed in the ICT sector have not been touched upon.

In the global context, some of the studies are found in ICT in the form of development agencies' reports. However, detailed studies linking the perceptions of

students, employers, and academicians in the ICT sector are not found. Most of the scholarly research (e.g., Suhaimi et al., 2012; Picatoste et al., 2017; Saad & Majid, 2014; Pruijt, 2012) have taken ICT as an additional skill concerning employability. There is a gap in research with a focus on the ICT sector as a significant research area on employability.

Besides, this researcher conducted a content analysis of articles on employability using MMR design. The methodological insights were examined using content analysis. The analysis was purposive, with the author's selection of articles focusing on the leading journals which published employability articles from 2010 to 2019. Thirty-four articles were selected from the pool of 744 articles from 7 journals, such as the Journal of Teaching and Learning for Graduate Employability (n= 87), Education+ Training (n=185), Journal of Education and Work (n=66), Studies in Higher Education (n=191), Journal of Vocational Behavior (n=142), Quality in Higher Education (n=29), Journal of Further and Higher Education (n=44) on the issue of employability. The analysis reveals an increasing trend of using a mixed-method approach to employability issues. However, there is a gap in methodological rigor and engagement in qualitative strands. Articles with quantitative priorities have not conducted qualitative analysis in depth. Most of the articles were based on about 30 to 120 min interviews with the participants to support the qualitative study. Only three articles mentioned the type of qualitative inquiry they used. The analysis of a robust body of qualitative and quantitative data with personal reflection coming from a more profound understanding supports the outcomes of most of the studies. Studies can further be strengthened with the informed engagement of both qualitative and quantitative strands in existing studies on employability. Therefore, a rigorous study using MMR contributes to examining employability.

Theoretical Referent and Framework

The employability context of fresh graduates can be best described through the social cognitive career theory (SCCT). The root of SCCT can be traced to Albert Bandura's general social cognitive theory- an influential theory for examining cognitive and motivational processes. Bandura's theory has been extended to the study of many areas of psychosocial functioning, such as academic performance, health behavior, and organizational development (Lent et al., 2002). The theory was also connected to career perspectives and called SCCT.

SCCT is more concerned with the specific cognitive mediators through which learning experiences guide career behavior, how variables such as interests, abilities, and values interrelate, and the specific theoretical paths by which personal and contextual factors influence career outcomes (Lent et al., 2002). For this study, the interests and contextual factors of the students matter in their employability. SCCT also highlights how individuals exercise personal agency in their career development. ICT students are directly linked to their personal agency and career path. Social capital, emotional intelligence, and non-technical skills (referred to as employability skills) are integral parts of human capital and are equally relevant in enhancing better relationships among workers, which can lead to improving the situation. SCCT not only accommodates the personal context but also links the environment and social context.

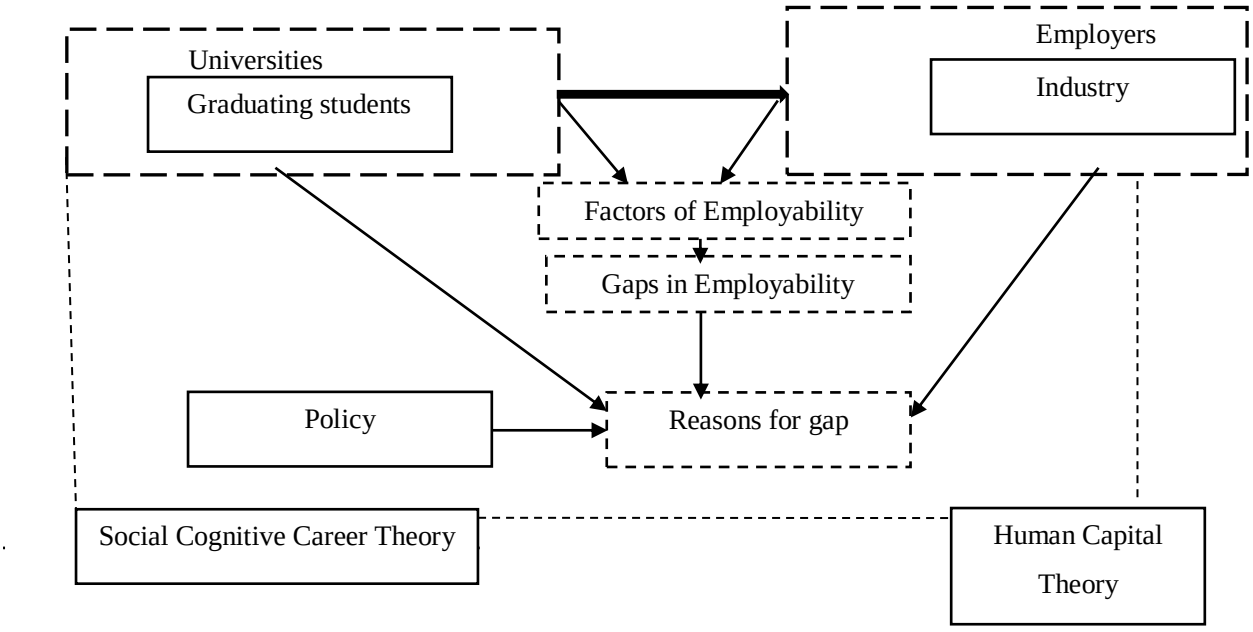
One's career choice is influenced by systemic barriers such as self, immediate proximal, and larger societal contexts (Lent et al., 2002). The relative proximity influences the motives and directions of graduates. Under supportive conditions, one aspires to the consistent field of developing goals. Academic and personal priorities and expectations may be different for engineering students while distinguishing

between content goals (the type of activity or career one wishes to pursue) and performance goals (the levels or quality of performance one plans to achieve within a chosen endeavor). By setting goals, people help to organize, direct and sustain their behaviors, even over long intervals without external payoffs (Lent et al., 2002).

The other aspects in terms of education and training have a major influence on labor productivity and employee income. In the theory, there is a single, efficient and fair labor market where jobs and wage levels are directly related to the worker's skills and knowledge. Job availability or job-related tasks are not decisive factors in the function of adequate employment or income formation. From a strategic management perspective, physical resources confer little advantage to organizations because they can be bought and sold in the open market with ease (Rothaermel, 2013). In the knowledge economy, it is the intangible abilities and skills of the workforce and the knowledge inherent in the organization's structures, routines, systems, and processes which can contribute to the knowledge capital of the organization (Mahoney & Kor, 2015). Hence, the Human Capital Theory (Becker, 1985) and SCCT can explain the employability concerns from the perspective of employers and graduating students.

Figure 1

Theoretical Framework



Chapter Conclusion

In this chapter, employability, its notion, and its construct have been presented. The constructs of employability are mostly contextual, and its discourse has developed over time. Along with its development, several practices and models were developed. Most of the models emphasized work-integrated learning and strategies to enhance the employability of students. In Nepal, employability is comprehended along with the development of formal labor and a formal education system. However, without incorporating it into policy, the employability agenda did not speed up. Consequently, the gap in employability between what employers expect and the graduating students prepare themselves for is visible and requires exploration.

CHAPTER III

RESEARCH METHODS

This chapter begins with a discussion of paradigm position of dialectical pluralism. Then, the explanatory sequential mixed method research design adopted for this study is presented. Thereafter, scale construction using the Delphi technique is explained. The section also includes the process of reaching the sample size of the study from the population of information technology students and employers, followed by data collection, analysis techniques, and the process adopted for this study in both phases (survey and case study). This chapter concludes with an explanation of the validity, reliability, credibility, and ethical considerations of this study.

Research Philosophy

Considering research problem, this researcher wanted a paradigm that could value both objective and subjective dimensions. The other criteria for selecting the paradigm involved finding the best solutions to the research gaps (Molina-Azorin & Fetters, 2020). With the same purpose, this researcher reviewed the literature and found that the most popular mixed method research paradigms are “pragmatism” (Creswell & Planoclark, 2018), “transformativism” (Meterns, 2015), “dialectical pluralism” (Greene, 2007) and “critical realism” (Maxwell, 2010). Among these, the researcher found that “dialectical pluralism” (Johnson, 2017) could be the basis of the philosophical perspective of this study, mainly for two reasons. First, it affords her adequate opportunities to accommodate multiple perspectives and paradigms for producing collaborative knowledge from objective and subjective exploration. Second, in the process of dialoguing objective and subjective outcomes, she could

reach the next level, which was not possible with a single approach. With the same consideration, the researcher acknowledged the knowledge grounded in a general sense and the knowledge that differs among employers and students and their experience in the ICT sector (Creswell & Clark, 2018). This was in line with the view that either the post-positivist or humanist construct was limited to exploring reality (Kivunja & Kuyini, 2017). Therefore, this position helped the researcher to understand the notion of employability through both subjective and objective lenses. This is why, the researcher decided to apply both humanist and post-positivist ways to understand the reality related to the idea of employability. This position also helped the researcher to emerge into the research problem accordingly.

With the same consideration, the researcher began to explore her ontological position, which is that the employability of the ICT sector has its objective meaning, and its subjectivity can be examined through engagement with the participants. A graduate enters the job market or gets into economic activities after the study. Here, nature and reality were explored and examined not only with the empirical and foundational constructs in employability but also with the personal experience and feelings of the participants.

With an ontological consideration, this researcher engaged with the exploration of employability and the study helped me to establish the faith she placed in the data and uncover knowledge in the social context (Kivunja & Kuyini, 2017). Therefore, epistemological assumption was that this research identified the factors associated with employability from the standpoint of ICT employers and the perspectives of students. It also avoided the dependence on a single standpoint and shaped active engagement in constructing knowledge and arbitrating quality.

This study was based on the knowledge generated through heterogeneous and

homogeneous wholes that respect multiple standpoints, with an emphasis on bringing theory into practice. For objective exploration, survey research was used, and for subjective exploration, a case study (e.g., Stake, 2005; Lichtman, 2011). When this researcher chose the case study, she found in the literature that there are two schools of thought in it: post-positivist and humanist. Of these, the humanist paradigm was adopted for the case study. With the paradigm view, the researcher found that the knowledge associated with employability is in the peoples' perceptions and understanding. This is in addition to the survey applied in this study with a view of the knowledge of employability in a broader context. The interaction of these two distinct paradigms helped the researcher to delve into inquiry (i.e., employability and its construct) in-depth. This position is also reflected in her axiological stance.

Having post-positivism as the ontological stance in the survey, this researcher remained independent from the data collected from the respondents. Therefore, the researcher separated her from the research settings at all stages of the research process. In the meantime, the researcher was fully engaged with participants and examined their context in case study. The researcher was also involved in making the interaction of the two distinct worldviews, which supported this research to bring it to the next stage of meaning-making.

Research Design: An Explanatory Sequential Mixed Methods

With the ontological position as explained above, the researcher followed a mixed methods study (Onwuegbuzie & Turner, 2007) because she believed that neither the quantitative nor qualitative method was singly sufficient to capture the complexity of the issue of employability from the perspectives of ICT employers and students. When used in combination, quantitative and qualitative methods complement each other and enable a complete analysis (Teddlie & Tashakkori, 1998).

Through this understanding, the researcher was able to get valuable contributions from both subjective and objective approaches to research (e.g., Johnson & Onwuegbuzie, 2004). This further led her to the notion that there were two distinct and successive stages. With this knowledge, the researcher realized that through both these inquiries, she got an opportunity for a deep and broad analysis of evidence (Ivankova et al., 2006) of employability and its constructs experienced by students and their potential employers by using an exploratory sequential mixed methods design. In the sense, this study is exploratory in nature. The study is also descriptive and analytical (Synder, 2019) because the result from the first phase is examined further from several dimensions in the second phase.

The explanatory sequential mixed methods design served the purpose mainly for two reasons. First, it is one of the most popular mixed methods designs in educational research (Creswell & Clark, 2018). Second, this researcher was able to examine the constructs of employability in depth (Creswell, 2009) by using it. In the design phase, the quantitative, numerical data were collected by using a survey from the employers and graduating students and analyzed using exploratory factor analysis. With this, the constructs of employability in the ICT sector were explored. Then, employability developed among graduate students and explained by employers was measured, and, in the process, the gap in the perspectives between the two stakeholders was explored. Then, the researcher connected the results to the first phase of this study with some cases of interest by using a qualitative multiple case study approach to understand the reasons for the existing gaps among employers and graduating students in the ICT sector in Nepal.

After this researcher decided on an explanatory sequential mixed methods study, it was necessary to bind into four key decisions (Creswell & Plano Clark,

2018). The four major decisions in a study of mixed methods design are 1. level of interaction, 2. priority of strands, 3. timing, and 4. point of integration. Out of these four key decisions, the levels of interactions between the two strands had two choices: independent and interactive (Creswell & Clark, 2018). Both are established ways of interaction in MMR design. In the independent study, integrations are made at the discussion level mostly at the time of presenting findings, whereas, in an interactive study, both strands are interacted from the early phase of the study. In this study, the level of interaction was interactive, and dialoguing the strands helped me to obtain meaning and powerful insights.

Regarding the priority of strands, there were three choices: equal, quantitative, and qualitative. This researcher has chosen the equal one for this study. By this, the researcher was able to get the strength of both strands by applying the specific strength of each methodology, thereby contributing to exploring the depth of the employability discourse. The timing of the strands-simultaneity or dependence- is also one of the key decisions of MMR (Creswell & Clark, 2018). In simultaneity, two strands go together, but in the case of dependence, one strand comes after the other. This may happen not only during the data collection phase but also during the entire study. Teddlie and Tashakori (2009) suggested parallel, sequential, conversion, multi-level, and fully integrated designs are different from each other. Creswell and Clark (2018) also explained concurrent, sequential, and multiphase timings. Understanding the importance of timing, in the third key decision of timing, the researcher has chosen the sequential one. By this, the result from the quantitative inquiry was further examined with the insights from the case study.

Integration is key to MMR and, thus, it was necessary for the researcher to decide where and how to mix. The point of integration and stages of integration were

well considered in this study (Johnson & Christensen, 2017). In the fourth key decision about the issue of integration, the result from the quantitative study was integrated with the qualitative study. It was at the end of the quantitative results that an employability gap was explored with quantitative data, and qualitative inquiry was taken further to explain the gap. The researcher also chose integration in the time of interpretation in this study. This led to insights additional to the result from the survey alone (Teddlie &Tashakkori, 2009). Additionally, joint display (Johnson et al., 2017) was used to present the results of both qualitative and quantitative studies together because it has been one of the emerging trends to report mixed analysis.

Instrumentation, Data Collection, and Analysis

This study had two phases. In the first phase, the survey method was used, while in the second phase, the case study method was employed. The distinct phases have been reported in two sections: Phase I and Phase II.

Phase I: Survey

In this study, this researcher used a survey questionnaire (ANNEXURE III & IV) addressed to graduating students and their potential employers in the first phase, to measure employability. The process of questionnaire construction is explained in this section. Then, the process of analysis of the data using descriptive statistics and exploratory factor analysis is explained. Before the aforesaid, population and sample strategies are presented.

Population and Sample

Employers of ICT sectors and students graduating from ICT colleges in Nepal comprised the population of this study. While selecting the sample, this researcher followed the “three stages of sampling procedure” (Bhattacherjee, 2012). In the first stage, the population of the study was defined. The population of employers was

obtained from the company registration office in Kathmandu. To obtain their list, a formal request letter was submitted to the company registrar's office explaining the objectives of this study. With the request from the office, the study was presented to the registrar, and with his approval, the data base officer provided a list of ICT companies in Nepal in an Excel sheet. The Excel sheet had six codes for the ICT companies with each code consisting of the names of several ICT companies. In the list, companies with the code of computer hardware had code number 7210; computer software had code number 7220; data processing computing, communication, technology, outsourcing, and all related database companies had code number 7230; data services of finance, statistical, computer- related, online business, and e-commerce had code 7240; service and repair companies had code 7250 and other categories code 7290. In the processing of the list, this researcher realized that certain companies had two or more codes, and those repetitions were deleted. Finally, a total list of 7628 companies from all six codes was obtained. This was the population of the ICT companies used in this study.

For the graduating students, the final-year students studying in the ICT sector were selected because they were not only in the final stage of the academic degree but also preparing to enter the labor market. For the same, this researcher required a list of students graduating from the universities. The researcher requested the universities to provide a list of the students studying ICT at the undergraduate level in those universities of Nepal. Similarly, a list of colleges offering bachelor in computer engineering, bachelor of information technology, bachelor of engineering in information technology, bachelor of computer information system, software engineering, foreign university-affiliated colleges, bachelor in computer application, bachelor of education in information & communication technology, Bachelor of

science in computer science and information technology, and bachelor in information management from all the universities in Nepal were contacted to obtain the list of final year students. Ultimately, the researcher found 4371 students graduating in April 2021.

The list of employers received from the company registrar's office and the list of students from colleges formed the sampling frame of this study. After deciding on the frame, the researcher planned to draw a representative sample with careful supervision (Cochran, 2009). With the plan, the sample size of this study was determined from the sampling frame with the help of Cochran's Formula (Cochran, 1963), which is as follows:

$$\text{Sample Size } (n_o) = \frac{z^2 pq}{e^2},$$

where z = 1.96 for 95% confidence level, p = 0.5 and q = 1- p = 0.5, e (level of precision = 5% i.e., 0.05. When this formula was applied to the above-mentioned population, the size of the sample was arrived at as 385.

Now, using the finite population of Employers (N_1= 7628) correction for proportions, the formula is

$$n_1 = \frac{n_o}{1+\frac{(n_o-1)}{N}}$$

Thus, the value of n_1 is 367 (approx.), which is the required sample size for the study.

Similarly, for the finite population of graduating students (N_2 = 4371) with the same formula, the value of n_2 is 354 (approx.). The population and samples are presented in Table (3).

Table 3

Revised Population and Sample

SN	Respondents	Population	Sample	Form received during the survey
1	Employers in the ICT sector	7628	367 (n_1)	390
2	Final-year students of the ICT Sector	4371	354 (n_2)	445

The lists of employers and graduating students were arranged alphabetically. The emails and contact details of employers and graduating students were collected. This researcher did not get the contact details of all the employers and graduating students. To get the contact list of employers, the name of the company was entered in a Google search. When the companies with names that started with "A" were completed, the researcher moved to the alphabet "B" for the search. The process continued till the researcher reached "Z" and got details of 1654 companies. Therefore, only 21.68% of the contact data of the ICT companies in Nepal was found in the public domain (websites, Facebook and Instagram). The final list was prepared in an Excel sheet.

For the contact details of graduating students, this researcher prepared the lists of colleges and their contacts, as the researcher was not able to approach them individually. Most of the colleges provided contact lists of the principal, coordinators, and department heads. Some colleges also provided contact details of the class representative. All the contact details were documented in an Excel sheet. Altogether, 189 contacts of colleges, including email addresses and mobile phone numbers, were sorted, covering approx. 4000 students. In the data collection process, the class representative was a good contact point for the follow-up process.

At the end of survey period of three months, 445 students and 390 employers responded, which 26.9% and 11.1%, was respectively, of the total surveys sent. The response rate was adequate because the response rate of online survey is lower than on-paper survey (Nulty, 2008). Nair et al. (2008) also believe that a 10% or lower response rate provides trustworthy result in the online survey.

Scale Construction using Delphi Technique

The Delphi Method (Linstone & Turoff, 2002) was used to identify the initial items and examine the dynamics of employability in the exploration of the study. This researcher believe that Delphi is a subjective judgment for effective communication, where several brains are better than one (Crawford & Wrights, 2016), and the process helped me to obtain a contextual scale to measure employability. Due to the pandemic situation, face-to-face meetings with the respondents were not possible and thus the researcher followed the e-Delphi (Keeney et al., 2011). The e-Delphi is similar to classical Delphi and administered via email/internet. Seven steps were followed while constructing a scale using e-Delphi (Keeney et al., 2011). The strategies adopted for e-Delphi are presented in Table (4) and discussed as follows:

Step 1: In the first step, the literature concerning employability in the ICT sector and its constructs obtained in the literature were reviewed. After understanding the construct and the context of employability in the ICT sector, the researcher realized that there is a dire need for research in the context of Nepal. The outcomes of the first step were the validity of the issue in the context of Nepal, existing gaps, and exploration of the related literature on employability in the ICT sector.

Step 2: After the researcher obtained meaningful insights, panels were identified to discuss in-depth employability in the ICT sector in Nepal. The criteria for selecting the experts were prepared simultaneously. The selection was purposive, with

2 graduate students who just joined an IT company, 2 final-year graduating students (1 from a renowned college and 1 from an average college), 3 employers (1 from a software company with a business focus on Nepal, 1 from a business process outsourcing firm and 1 from the telecom industry), 2 academicians (1 from a university well recognized in the IT sector and government and 1 with international exposure and knowledge in both ICT and employability). All experts were consulted on an individual basis. Two rounds of interviews were conducted via the blended mode (face-to-face as well as using Google meet). Google meet was utilized because some did not have time for personal meetings due to their busy schedules, and some were taking precautions due to the pandemic. As an outcome of this step, a broader question was prepared: "What skills and competencies are important for ICT graduates to be employed or to run their own business in Nepal?" In addition, most of the experts provided their insights and experiences, which were helpful throughout research process. Besides, a few experts shared some books and journals, providing additional insights.

Table 4

Activities Carried Out for Delphi

Steps	Activities carried out for Delphi
1	Literature review; established the need for research; reviewed availability of resources
2	Identify and define the level of panels; prepare criteria
3	Identification of potential target population; selection of expert panel; review of sample; gain names and addresses; develop strategies; develop an administrative process
4	Prepare broader questions with an expert; send a letter for permission/willingness to participate
5	Send emails with broader questions; send an email of appreciation for the previous responses; items listed and sent to experts; follow-up done with

	point contacts if they agreed on item list; second round of appreciation; lists prepared from all the received responses
6	Finalization of the item, removal of redundant items, developing five-point Likert scale for consensus/consensus workshop
7	Prepare statement in English; statement in Nepali; share with panel members; consult with linguist; back translation; finalization of questionnaire

Step 3: After a broader question was prepared along with a few experts, it was time to consult with the larger group, for which this researcher prepared the criteria. With the criteria, the researcher selected graduate students who joined IT companies within 2 years, students in the final year of bachelor level, employers listed in the company registrar's office as ICT companies, and academicians teaching ICT courses. Then, the researcher contacted colleges, employers, the Federation of Nepalese Chambers of Commerce and Industry (FNCCI), the Federation of Computer Associations of Nepal (FCAN), BPOs, and the computer department of some universities and engineering schools. This researcher visited some of their offices in the process. Consequently, lists of experts were ready with their phone numbers and email addresses.

Step 4: An open-ended question, “What are the skills and competencies important for ICT graduates to be employed or to run their own business in Nepal?” was sent via email to 115 selected employers, 95 graduating students from 6 colleges, and 60 fresh graduates who had joined the companies within two years. Along with the question, a cover letter mentioning the objective of the study was sent to the experts. Among them, 36 employers, 41 graduating students, and 55 fresh graduates who joined the company within two years agreed to participate in the Delphi process by replying to email.

Step 5: An email of appreciation was sent to all the responders. Although the response rate in step 4 was good, the actual response to the question was sent by only 19 employers, 35 graduating students, and 28 fresh graduates. Some experts replied within a day, some after a week, and some after follow-up. Even after two weeks of follow-up, when the researcher didn't get responses, she prepared the final list of the items sent by the experts.

Step 6: Letters of appreciation were emailed to those whose responses were received. Then, out of 115 items, 97 were finalized, removing the redundant items. For example, technical skills were selected because technical abilities, technical know-how, and technical understanding were similar to it. However, before the researcher deleted the items, she consulted the initial panel of experts who helped in defining the broader question once again. Then, those items were linked to a five-point Likert scales:1- strongly agree, 2- agree, 3- neutral, 4- disagree, and 5- strongly disagree (Albaum, 1997) for using them to get responses. Then, the items were prepared in a Google survey. There were 97 survey items, with 13 fresh graduates, 16 employers, and 23 graduating students replying at this step.

Crawford and Wright (2016) suggested that the consensus of more than 70 % of the respondents is required in finalizing items in the Delphi process. Therefore, the items which had scored more than 70% of the respondents approved for the study. Ultimately, 45 items were finalized and the list with the items was sent to all the experts who participated in the Google survey for information. Personal attributes (13), 21st Century skills/fourth industrial revolution skills (10), workplace learning (7), soft skills (4), management skills (4), and technical skills (7) were the identified dimensions with the respective items. The final outputs obtained in the process are presented in Table (5).

Table 5

Dimensions and Items Finalized by Experts in the Delphi Process

Dimensions	Items
Personal attributes	Accountability, calmness, confidence, empathy, ethics, flexibility, hard work, stress management, passion, proactiveness, result- orientation, self- discipline/self-organization, smart work
21st-century skills/ fourth industrial revolution skills	Adaptability, agility, analytical skills, creativity, innovation, critical thinking, logical reasoning, problem-solving skills, acumen, zeal to learn/learning aptitude
Workplace learning	Project management, entrepreneurial skills, workplace learning, internship, ownership of work, collaboration, teamwork,
Soft skills	Communication skills, documentation skills, excellent verbal and written English communication, presentation skills
Management skills	Facilitation skills, prioritization skills, time management, pressure handling/managing work stress
Technical skills	Computer hardware skills, computer software skills, technical capabilities, technical aptitude, process management, digital transformation awareness, digital divide

Step 7: Finalizing the dimensions and the items under the study, the questionnaire was constructed. Two sets of questionnaires were prepared – one for employers and the other for the graduating students. In both sets, questions related to the demographic information were added in part A; and items from the Delphi process were listed in part B. The Likert- type statements had a six-point scale: (6- Agree, 5-

Mostly Agree, 4- Agree, 3- Somewhat Agree, 2- Slightly Agree, 1- Very slightly Agree) were prepared (Albaum, 1997). This researcher has chosen the six-point Likert scale than the five-point one to mitigate high discrimination and ensure reliability (Chomeya, 2010).

The final questionnaire was sent to all the experts who participated in the round 2 panels. After this researcher received positive feedback from the experts, the questionnaires were finalized. The questionnaires in English were translated into Nepali and sent to the experts for their input. They were also sent to professionals for back translation from Nepali to English. Most of the experts suggested presenting both English and Nepali questionnaires for clarity. This was done in a google survey for a pilot test.

Thereafter, the questionnaires were sent to employers and graduating students for the pilot survey. After the researcher received the responses, the data from 36 employers and 35 graduating students were extracted from Google in an Excel sheet. Then the forms were imported into SPSS version 25 software, and the Cronbach Alpha coefficient was calculated. The result has been explained in the reliability and validity section of this chapter.

Data Collection and Analysis

After the questionnaires (ANNEXURE III & IV) were prepared, this researcher emailed them to the respondents. In the email, she indicated the Google link to the questionnaires. The emails were sent to 1654 employers along with a cover email and a formal request letter from Kathmandu University. The purpose of the research and assurance of data confidentiality were explained in the cover email.

To obtain information from students, the researcher sent the link of the survey to 189 email addresses of principals, coordinators, and department heads, and in some

cases, class representatives. She also sent the email with a request to forward the link to final-year graduating students. Along with the email, a cover letter and a formal request letter from Kathmandu University supporting the research process were also sent. The purpose of the research and confidentiality of the information were explained in the covering email.

For both employers and graduating students, three months (July 2021 to October 2021) were allocated to receive the responses. The responses were automatically recorded in a Google spreadsheet created for collecting the data. After the respondents filled up the questionnaire and submitted it to me, they were thanked for their time and efforts through an automatic reply on the Google survey. On administering the survey, the researcher noticed that many respondents answered the survey, but the required number of responses was not received in the first month. Specifically, the researcher received 97 responses from graduating students and 57 from employers in the first month, which are not adequate for this study. Then, the researcher started following-up by calling them and requesting them to support by filling up the forms. After follow-up, she started getting satisfactory numbers. To get more direct access to graduating students, the researcher also contacted the student's association of Computer Science and Information Technology. They supported to double-check the access of the survey link sent to the students. The members of the association supported to find the colleges where the link was omitted to be shared among the students by the college authority.

Before this researcher started to request the respondents to fill up the forms, she put the forms' active date till November 2021. At the end of November, 445 students and 390 employers had responded to the survey. The number was higher than

the sample size required for this study. After the data were collected, it was necessary to prepare the final database for analysis.

This researcher developed the database initially by exporting the Excel sheet from the Google survey and then by importing it into SPSS. She screened the data to rule out any missing values. There were no missing cases and values. Then, the data were analyzed with the statistical technique, drawing the inferences for each of the research questions.

The first research question of the study was to ascertain the factors associated with employability in the ICT sector in Nepal. For this, it was necessary to identify the components of employability. Factor analysis was used to determine the underlying components (Kerlinger, 2008). This technique compiles highly correlated variables; hence, associated employability and variables were identified and structured among a set of variables for the standpoints of employers and students. Factor analysis is of two types: component analysis and common factor analysis. Between them, common factor analysis, also called exploratory factor analysis (EFA), was used for this study (Costello & Osborne, 2005). In EFA, the extraction of factors is usually conducted by principal components analysis (PCA), which was employed in this study. It is one of the most common techniques used for the calculation of factor loadings. Specifically, the principal component analysis with varimax rotation was applied in this study. In the analysis, Keiser-Meyer- Olkin (KMO) score (0.967) and Bartlett's test (Significance) were verified to understand the adequacy of the data before factor analysis. The researcher followed Kaiser (1974) who suggested that for KMO in the 0.90s adequacy is marvelous, in the 0.80s meritorious, in the 0.70s middling, in the 0.60s mediocre, in the 0.50s miserable and below 0.5 – unacceptable. The other assumption was that Bartlett's test of sphericity should be significant (0.05).

After checking both KMO and Barlett's test of adequacy (results presented in Chapter IV), PCA was employed. The next step in the analysis was the extraction factors explained with Eigen value, cumulative percentage, scree plot, component matrix, and rotate component matrix. Eigen value explains the amount of variance in all the components (Williams et al., 2010). There were three components with more than 1 eigenvalue, meaning that the number of factors formed in the analysis was three.

To address the second research question, the mean and standard deviation of each factor were calculated to measure the level of employability in ICT at three levels (high, medium, and low). Additionally, the mean interval of each factor was calculated by dividing by 3 (Polit & Hungler, 1992) to understand the level of employability in three categories: high, medium, and low. In analyzing the level of employability, a standard competency scale was also used (Langlois & Lapointe, 2010). The scale consisted of the typologies in which a score from 1.0 to 3.5 indicated the "traces," 3.6 to 4.4 indicated "emergence," 4.5 to 4.8 represented "presence," 4.9 to 5.5 indicated "consolidation" and 5.6 to 6.0 was considered the "optimization level". The mean value of each attribute was taken as the score for the scale. Furthermore, a t-test was also applied to know the significant difference in employability factors perceived by graduating students and those of employers. Thereafter, the analysis of the level of employability of graduating students and employers was conducted. The basis of the study of measuring the level of employability was the mean and standard deviation of each factor. The mean of each factor was obtained by calculating the mean of all the retained items.

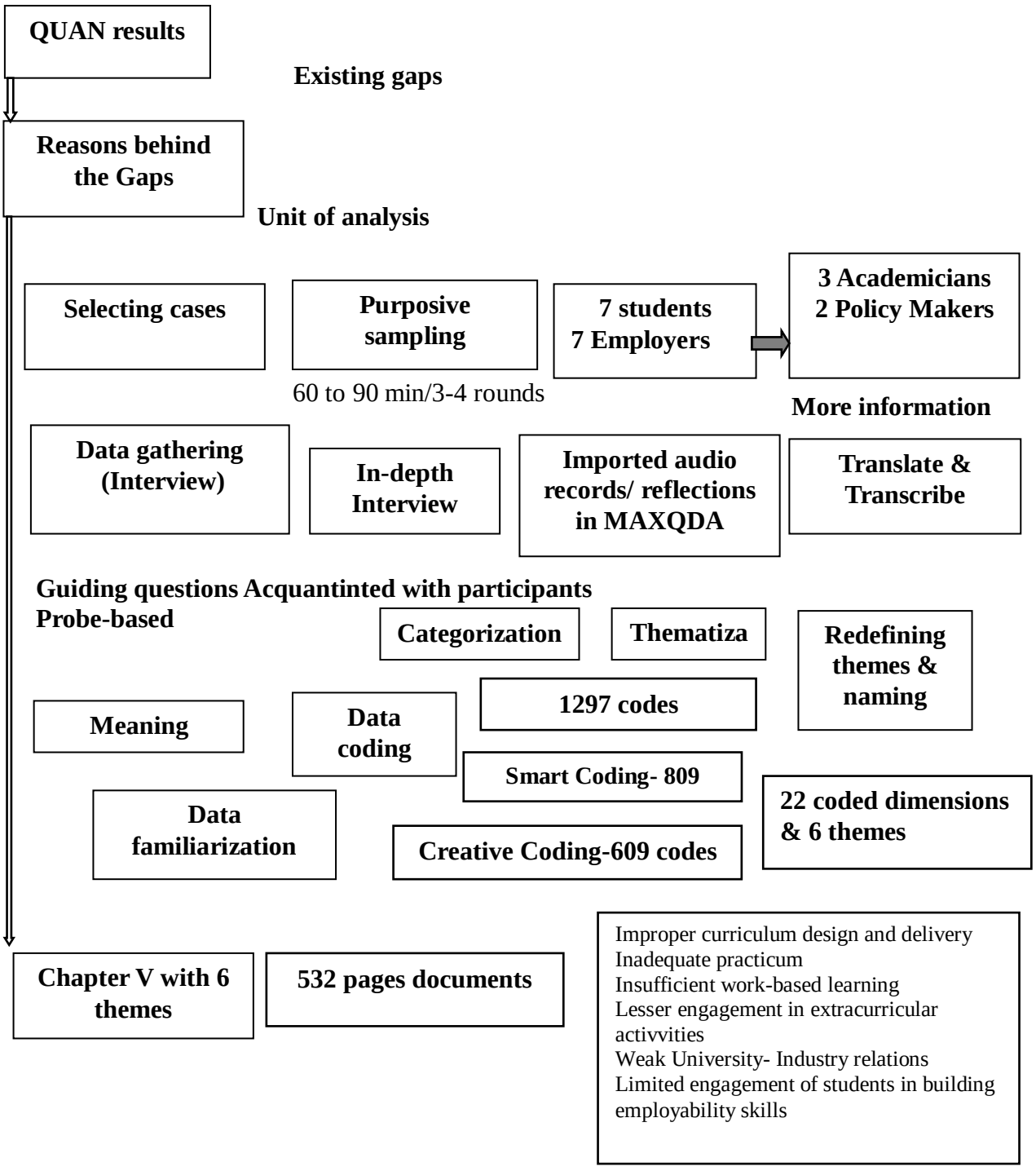
Phase II: Case Study Research Strategies

In the second phase, a qualitative multiple case study approach (Stake, 2005) was used to collect narrative data through individual in-depth interviews (Figure 2).

This phase was used to explore the reasons behind the existing gaps explored in the first phase of this study. In the first phase, the factors contributed to and/or impede students' employability. The second phase was used to explain those statistical results by exploring the participants' views, experiences, and feelings in depth. The unit of analysis of the second phase was the reason behind the existing gap in employability in the ICT sector. The reasons behind the gap were explored with the employers, graduating students, academicians, and policy makers. The process of the study has been presented in Figure 2.

Figure 2

Qualitative Research Strategies



Created out of (Stake, 2005; Braun & Clarke, 2006; Creswell, 2012; Yin, 2018)

Selecting the Cases

This researcher selected the cases to explore the reasons behind the gap indicated by the quantitative study. The researcher identified cases purposively among

the respondents of the survey. She further took three main criteria for selecting the cases (Stake, 2005): 1. case relevant to quintain 2. diversity across the context, and 3. opportunities to learn complexity and context. She began the study with 4 students and 4 employers representing graduating students and employers. To represent the quintain, 4 graduating students were selected, one each from government-funded, private, affiliated, and college with another country affiliation. Similarly, employers were selected from the big, medium size with global and local operations, medium size company with local operations only and start-ups. Through this, the researcher wanted to get diverse views of the participants from various companies. During the process, participants indicated the issues and agendas related with various stakeholders during the interview as academic institutions and policy makers. The researcher realized that she needed additional information from the diverse stakeholders as mentioned by her participants and, thus, added 3 graduating students and 3 employers. Additionally, she also added 3 academicians and 2 policy makers. A short introduction of participants is as follows:

Students

Saugat came to Kathmandu for further study. He has been interested in the ICT sector since he was young. After completing higher secondary education, he thought of joining computer engineering, but changing his mind, joined Computer Science and Information Technology (CSIT) because he wanted to study something related to the software field. He was in the final semester in one of the reputed colleges and was waiting to complete the final exam. His interest is in development and technology. He thinks that he has expertise in programming languages, which he started learning when he was in the eighth grade in school.

Sugam is currently pursuing his undergraduate studies and is in the 8th semester. He has just completed his exams and is awaiting the results. He is from a middle-class family, brought up by his single mother. During his undergraduate degree, he was exploring the sector from the perspective of policy-making, rather than actually dedicating himself to the core technical skills. He wants to be recognized as an ICT activist and aims to campaign for the development of the ICT sector.

Sajjan is a 22-year-old studying computer science in one of the colleges in a city of Nepal. He is preparing for his final exam. He has a passion for the technology sector. His interest in ICT arose when he started working at a corporate company as a software developer immediately after completing high school. He has his own start-up company for software development, with 11 staff members. He is a confident participant.

Sweta is studying computer engineering in one of the cities in Nepal and is in her final semester. She worked with a search engine optimization specialist during her internship. Thereafter, she started her own company but had to close it due to losses. She is planning to join work after completing her study until she gets a visa for her study abroad.

Smriti is studying in one of the government-funded colleges. She came to the city from a rural area after high school for her higher studies. She is in the final semester, and her interest is database management. She feels proud of having chosen the ICT sector, where the participation of girls is relatively low, compared to boys. She is planning to work for a few years before pursuing further studies.

Samragyi joined the ICT sector after she realized that all the instructors in computer science at her high school were males. She wants to be a female instructor in the future so that she can support many girls in the sector. After joining computer

science at the bachelor's level, she realized the dominance of males in the field. She is inclined towards programming languages and wants to be a freelancer. She is currently involved in a not-for-profit organization that encourages females in the technology sector.

The other participant in the study was Sushant. He could get several exposures after joining one of the associations in the ICT sector. He is also a Nepali student in a globally renowned company. Apart from that, he works in one of the biggest software companies in Nepal. He started working after completing his internship. He explained his difficulty in adjusting to city life, in his first year of study. Now, he is happy about getting a good opportunity and is also preparing to go abroad.

Employers

Aakar is the founder of a software company in Nepal. He leads more than 75 full-time employees and 150 part-time consultants. He also owns a company that provides a learning platform for graduates and learners.

Ankit is the chief executive of a Nepal-based ed tech company and also the chief operations officer of a Singapore -based company in Nepal. His companies have more than 400 employees. He is an enthusiast and has the ambition to take his companies to great heights. He believes in building the competencies of youth as an important factor in the ICT sector.

Ayush is one of the first internet entrepreneurs in Nepal. He is the founder/co-founder of 4 companies. One of his companies has global operations. He blames the mindset of people for incompetence. His network companies have more than 500 employees.

Alpa is the head of the human resource department of an IT company. She has been working in a reputed fintech in Nepal for 9 years, where the number of

employees has grown from 12 to 230 in 6 years. They welcome interns and offer a learning environment to fresh graduates. She believes that the success of the company depends on the hard work of employees.

Ayon studied in the USA and started working there. After completing his master's degree, he wanted to create something on his own and registered a company both in the United States and Nepal. He started an outsourcing company where he could take projects from the US, working from Nepal. He has more than 60 employees. He has also started an academic institution to offer Bachelor of Computer Application qualifications. He wants to build the capacity of youth, aligning with global needs.

Avash is the Chief Human Resource Officer in one of the biggest companies in the telecom sector, with a national and international experience of more than 35 years. In his experience, graduates are theoretically sound, but that does not mean they can perform well in their work soon after graduation. His organization normally trains fresh employees formally or informally for more than 6 months.

Aarav started his ICT company as a sister company along with his own bigger recruitment company after realizing the scope of IT. He has 17 staff members in his ICT company. He believes that the ICT sector has opportunities for young graduates. In his opinion, skills enhancement should be made everyone's priority for the development of a nation.

Academician

Binay is the former dean of one of the universities in Nepal. He has diverse experience of more than 40 years working as a government employee, academician, and policy maker. He is directly involved in curriculum design and updates.

Biraj is the dean of one of the engineering schools in Nepal. He has more than 10 years of academic experience. He has global exposure and a network. He believes that technology can be obsolete at any time and thus one needs to remain updated and adapt to changes and adapt accordingly.

Bijay is the chairman of a reputed engineering college which runs several ICT courses. He has more than 25 years of experience. He leads collaborations with several employers and agencies working in Nepal to provide exposure to students.

Policy Makers

Nimesh is one of the retired policy-makers in the country. He contributes to policy formulation in different sectors including ICT, as a consultant. He brings more than 35 years of experience working in Nepal and abroad. He has practical experience in the challenges and the reasons behind such challenges in policy formulation and implementation in Nepal.

Nirakar is the secretary of a ministry in Nepal. In his personal experience of several years in policy making and implementation, he has witnessed the implementation challenges. He believes that the ICT sector is key to the future development of the country.

Data Gathering

After identifying the participants as per the criteria, this researcher prepared guiding questions (Annex V & VI) for both graduating students and employers. The guiding questions were mostly focused on exploring the reasons for the existing gaps in ICT employability. Thereafter, the researcher prepared the questions and contacted study participants via email from the contact list prepared for the first phase of the study. The contact details also included the mobile numbers of both graduating students and employers and their tentative locations. The researcher's initial focus

was graduating students and employers. She visited their locations to conduct interviews in their respective locations as per their availability. She also sought quiet places for the interview without distraction. She scheduled interviews with participants as per their availability. Her strategy for the first meeting was to provide an introduction and clarify the purpose of the study. The first meeting with the participants was primarily focused on getting acquainted with them (Stake, 2005). At the beginning of the discussion, she explained to the participants the nature of the study. The researcher reconfirmed their consent and asked them to introduce themselves. In the second and third rounds and in some cases the fourth round, questions were probe-based and leading, with general as well as specific inquiries.

The interview sessions were normally of 60-90 minutes. Before this researcher began, she had an informal conversation with the participants. During the informal session, she used to assure them about the ethical norms of the study of using pseudonyms. During the interview, the researcher gave adequate opportunities to participants to express their opinions and probe (Bloor et al., 2002) on occasions. She also provided ample opportunity for participants to ask me questions if they had any. Each meeting was recorded with their permission. She used both her phone and laptop for recording, using the application voice recorder. The researcher also took notes of the crucial points the participants mentioned during the interview in her field diary. It was more comfortable to discuss with participants in the second, third and fourth rounds. The researcher felt that participants understood the questions quickly in subsequent rounds and provided more focused information on the phenomenon.

After each meeting, this researcher wrote reflections that helped her to get into the issue raised by the participants and made her realize that she required additional participants and related stakeholders such as academicians and policymakers.

Consequently, she added 3 graduating students, 3 employers, 3 academicians, and 2 policy makers to explore the reasons behind the employability gap. After data collection, all the interview records and reflections were imported into MAXQDA 2020 version and compiled in a folder. The researcher listened to each interview and reflected on the participants' views and ideas. As the interviews were conducted in the Nepali language, she translated and transcribed them using the MAXQDA multimedia browser. As the software did not support the Nepali language, the researcher had to translate it. The shorthand symbols of MAXQDA were handy and saved a lot of time/ For example, when she typed just "1", the system changed it to Person 1. Time stamps supported her in going back to the audio file where needed. Altogether, data of 532 pages in a single space was exported to a Microsoft word file as the output from the processing of software.

Meaning Making

The reasons behind the existing gaps in the graduate employability in the ICT sector were the major concern in the exploration. To explore the same phenomenon, the meaning-making process was initiated with data familiarization. However, the data familiarization process started along with data gathering. More specifically, in the process of data gathering, participants were met in person, and in discussions with them, this researcher familiarized the participants and the underlying meaning of the data they provided. In the process of transcribing the data as well, the researcher could even identify the participants from their voices and was reflecting on the insights she has gained concerning the research questions. To acquaint further with the data, the researcher heard recordings apart from reading the transcriptions and rereading the 532 pages of documents. After each reading, she prepared some notes, which helped her in the coding process.

After familiarizing with the data, this researcher started coding the transcribed interview using MAXQDA. New codes were created in the code system after reviewing the interview of each individual in document browsers. Basically, two options in the dialogue box were used for coding data, namely new code for evolving data and *in vivo* for the repeated ones. The coding process was reiterative and dynamic. In the coding process, the researcher accorded prominence to research question. For the interviews with19 participants, 1297 codes were generated and saved in the code system. Some extracts were coded multiple times. After coding, she categorized the data using smart coding and creative coding. In smart coding, the researcher was able to refine the detailed coding and reassign the content of the codes. It helped her in reducing the number of codes to 809. After the codes were done with smart coding, the researcher reorganized and restructured the coding to create a new grouping of the existing codes. In the process, she was able to get high-level concepts. It was a visualization and intuitive tool for categorization. Table (6) shows an example of the coding she has developed from transcribed interviews.

Table 6

An Example of Coding of 50 Coded Segment (from 12 documents) in MAXQDA

Data preview	Code
In Nepal, I felt that there is no match between what we study and what we need while working	Theory-based learning
For example, our teacher teaches us an object-oriented program	Theory-based learning
I felt no problem with the curriculum, but delivery is an issue	Curriculum delivery
It depends on the facilitators' interest whether to focus on the practical aspects or the theory	Facilitators' interest
Our college provides fewer opportunities for the practical part	Inadequate practicum

Teachers need exposure	Capacity building of facilitators
Students realize the irrelevance of the theoretical aspects	Theory-based learning

Ultimately, 609 codes were extracted using creating tools, which were used to generate 22 coded dimensions. This researcher then engaged herself in the construction of themes. To her, theme generation is an active process into which researchers put all their efforts from experiences gained and reflections discerned during selecting cases, data gathering, and the meaning-making process (Terry et al., 2017). She prepared a thematic map using visual tools of MAXQDA as MAX Maps and Code Relations browser. With this, the researcher reviewed the themes and prepared fewer themes covering the essence of all sub-themes generated from the 22 coded dimensions. In the final step, she reviewed the whole data set and ensured that the themes captured the patterned meaning that she wanted to convey concerning the research questions. In the process, the researcher revised her provisional themes again. For example, for the theme practicum, she redefined it as an inadequate practicum and renamed it. This researcher felt that a couple of themes did not reflect the reasons for the gap but provided a general idea. Therefore, she ended the thematization process when the themes were expressive of the meaning this study aimed to reflect. A total of 6 themes were generated. Braun and Clarke (2006) recommend that the number of themes can be limited to between 3 and 6. The themes obtained were redefined with naming. Six themes, along with their coded dimensions, are presented in Table 7.

Table 7

Six Themes with their Coded Dimensions

Themes	Coded dimensions
Improper curriculum design and delivery	Curriculum design
	Market assessment
	Stakeholder consultations
	Global trends
	Delivery skills of facilitators
	Outdated facilitators
Inadequate practicum	Infrastructure
	Theory-based learning
	Exam-oriented mindset
Insufficient work-based learning	Internship
	Mentorship
	Additional self-initiation training
	Work while studying
Less engagement in extra-curricular activities	Opportunities for competition
	Activities at and outside the classroom
	Exposures
Weak University-Industry relations	Counseling
	Collaborations
	Meaningful engagement
Limited engagement with students in building employability skills	Socioeconomic influence
	System and Policy
	Cultural influence

This researcher realized that the six themes she explored were adequate to understand the contextual meaning and thus contributed to the modification of general understandings (Stake, 2005) of the reasons for the gaps in graduate employability in the ICT sector in Nepal. Themes are mostly presented descriptively in Chapter V, along with the data extracts and interpretations of the themes. It is further discussed in

the context of the existing literature in Chapter VI. Based on the data analysis and interpretation, the researcher was able to explain the underlying meaning of the reasons for the existing gaps between industry and academia in graduate employability in the ICT sector of Nepal.

Integration of the Result

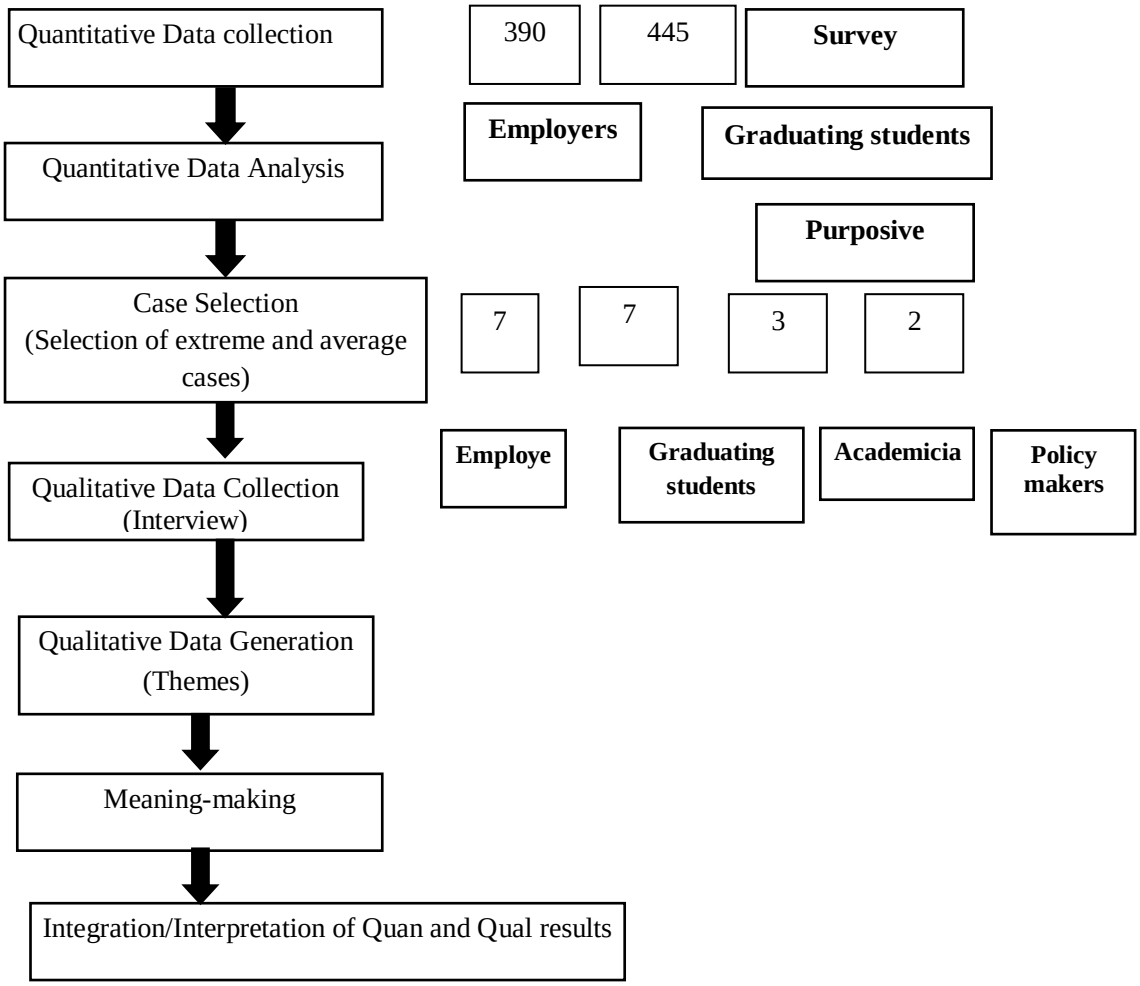
Data integration is key to mixed-methods research. As Fetter (2018) explained, there are countless possibilities from the combinations of both strands. The combination of such information enabled this research to be rich and helped in gaining different insights. With the process, this researcher obtained additional insights from data integration that enabled me to clarify fuzziness during data collection and analysis (Uprichard, 2019). Specifically, the quantitative strands provided a general understanding of the research problem underlying the graduate employability constructs in the ICT sector and the qualitative strands helped me to understand and explain the reasons for the gaps in the existing employability discourse in Nepal.

In this explanatory sequential mixed methods research, the typical connection of integration took place at three points. The first started while selecting the participants for the qualitative study and the follow-up analysis (Ivankova et al., 2006). Therefore, the integration in this study began after its quantitative phase when the participants of the qualitative study were selected. The second point of integration was when there was a development of interview guidelines for the second phase of inquiry. The third point and visual integration were made when the results of both strands were displayed in the findings and discussion chapter (VI). The output of the integration was presented as a joint display (Johnson et al., 2019). The researcher realized that the joint display (Figure 5) has been one of the emerging developments

in mixed methods research and is used in reporting the mixed method analysis. The display supported integration of the results of both quantitative and qualitative phases. By this, the researcher not only demonstrated the output of each strand but also reflected additional meaning-making that she got in the process of integration in this study.

Figure 3

Research Frameworks



Ensuring Reliability, Validity, and Credibility

This study had two phases: quantitative and qualitative. In the quantitative phase, the reliability and validity of the study were maintained. In the qualitative phase, credibility was given due consideration. The following section describes the same. In the quantitative phase of this study, this research followed the principles of

reliability, namely stability and internal consistency. For stability, the split-half technique was used to complete the reliability test. For internal consistency, Cronbach's alpha test was used. The acceptable reliability coefficient of Cronbach's α tests was considered the base for further amendments to complete the reliability. Cronbach's alpha value below 0.7 is generally not acceptable (Cohen et al., 2018). The Cronbach's alpha value of this study was 0.876, which was more than 0.70, and thus the reliability of the scale was ensured. Similarly, the reliability of the three factors of this study was also tested. The alpha value ranges from 0.769 to 0.814, which is at an acceptable level. The result is presented in Table 8.

Table 8

Reliability of Factors Associated with Graduate Employability in the ICT Sector

Components	Items	Coefficient of Cronbach's α
Core skills	10	0.814
Personality Attributes	8	0.743
Organizational Adaptability Skills	8	0.769

For this study, validity was concerned with the intended answers to the research questions based on graduate employability in the ICT sector with accuracy and quality (Gravetter & Forzano, 2006). The result reflects the extent of having evidence point to the intended interpretation (Creswell, 2012). This researcher ensured this exactivity by considering three major forms of validity: content, construct, and criterion-related (Cohen et al., 2018).

Among these three validities, content validity is the extent to which the items within a construct correspond to that construct or summated scale (Williams et al., 2014). Muijs (2004) simplifies content validity by explaining that it refers to the

degree to which the contents of the manifest variables or statements of the questionnaire are right to measure the construct or factor which is latent. So, ensuring content validity requires an assessment of whether or not the items are complete and correct to measure the latent concept. In this study, content validity was ensured both qualitatively (by taking expert opinion) and empirically by assessing uni-dimensionality and convergent validity (Hair et al., 2019). Specifically, content validity was assured through the Delphi process when she engaged the experts of graduate employability in the ICT sector which resulted in the development of a new instrument with a sufficient number of statements that were further contextualized. Keeney et al. (2011) also confirm that Delphi ensures content validity because it follows a set of rules systematically. In addition, extant literature (Bates et al., 2012; Tracey & Tews, 2005) was also referred to substantiate the instrument before pilot testing was made.

Another important form of validity is construct validity which ensures how well a test or tool measures the construct it is intended to measure (Bryman, 2016). According to Strauss and Smith (2009), it is the degree to which a measure examines the construct it is intended to measure. This researcher took the correlation coefficient as the indicator to assess construct validity (Carlson & Herdman, 2012). She reviewed the literature in which convergent validities ranged from a correlation of 0.2 to 0.82. The factors (or constructs as described above) were identified with sufficient factor loading above 0.50 for each item, with most items above 0.5, which was needed to ensure that the factors were not contaminated with items from other factors (Peter, 1981). Similarly, the value of 0.50 explained discriminant validity because there was no cross-loading, meaning that all the items were loaded on only one of the three factors.

Similarly, criterion-related validity (Kerlinger, 2008) was ensured with the comparison of the study to other similar studies conducted worldwide. Specifically, validity was assessed by comparing scores of a construct of this study with scores in other studies with a similar construct (Neuman, 2014). By all these strategies, the validity of the study was ensured.

For the phase of qualitative inquiry, the researcher used multiple strategies to maintain credibility because Creswell (2012) believes that a single approach is not sufficient. One of the strategies was to engage the participants to understand the unseen and untold stories of graduate employability in the ICT sector in the language and culture of the participants (Susanne & Rasmusson, 2015). For the same, the researcher immersed herself with participants with possible strategies. Her first meeting was mostly for rapport-building with participants. Then, she met them several times and engaged in their activities. Such engagement in the field with participants for a deeper meaning was one of her strategies for maintaining credibility. It provided her with an opportunity to delve into the depth of the cases. The process helped me build a relationship with the participants over a longer period and, thereby, helped me to collect a richer and deeper story of the 'hidden' concerns in the ICT sector, which could hardly be disclosed during a shorter duration of data collection.

Another strategy for maintaining credibility was thick description. Thick description involves elucidating all research processes from information collection, and the context of the study to the production of the final report (Anney, 2014). For the same, the researcher prepared a detailed explanation of this research, the context of the study, research gaps, the process of participant selection, and the information collection procedure she followed for this study.

The third strategy for this study was member-checking (Teddlie & Tashakkori, 2009). For it, the researcher always reconfirmed the information her participants shared during the interview process. In addition, she showed the transcribed documents to them in the follow-up meetings to check their accuracy and their immediate reactions. This researcher also sent the transcribed documents to some participants and requested them to ensure the accuracy of the transcription. This strategy was also helpful in the sense that participants provided information additional to what they expressed in the earlier meetings of data collection.

The fourth strategy for credibility was peer-debriefing (Teddlie & Tashakkori, 2009). This researcher requested professionals and practitioners to provide inputs for her every strategy of research design, field process, and analysis. The team for peer-debriefing comprised peers pursuing PhD in the Development Education Department. Her peers helped at each stage of her study. Supervisors and practitioners in the ICT sector provided their analytical comments and views, which helped her to ensure the trustworthiness of the study.

As a mixed methods researcher, this researcher also needed to ensure the credibility related to mixed methods research. For the same, she considered the possible validity threats as described by Creswell and Clark (2018). For authors, threat-inappropriate sample sizes for both quantitative and qualitative strands might weaken the validity of their study. Therefore, the researcher has chosen samples with a rationale in each phase, considering research questions. Similarly, the participants for the qualitative phase were chosen from those who had participated in the quantitative phase (Teddlie & Tashakori, 2009). In the data analysis, the meanings were sought with the interaction of both inquiries. In the interpretation, the results of both strands were not compared unless they were compatible. Then the researcher

presented the result in a joint display diagram so that results are clear and balanced to the insights of both strands (Fetters, 2018). In the process, she has also presented the value added by mixed method research in the discussion section.

Ethical Consideration of this Study

Ethical responsibility comprises ensuring the dignity of the research participants and the accuracy and honesty of the data and information (Gravetter & Forzano, 2006). The consent of the respondents was obtained before they responded to this study. The participants' confidentiality and anonymity were maintained by not disclosing their identities. It was human research that considered the research integrity (Preissle et al., 2015) of the study. For the same, ethics forms were filled up and submitted to the university, which contained a brief introduction to the study, the procedures for data collection, and information about the participants. Following guidelines, respondents were not forced or influenced to provide information. In the online survey, respondents were first provided with an option to a page which contained information about the survey, and also requested their consent before they started answering the questions.

Similarly, as an additional strategy for confidentiality, all information was extracted in a dataset and stored in a separate file. Then identifiable information was deleted from the dataset for analysis. Besides, the transparency and safety of the database were maintained. Only this researcher had access to the data file, and it was protected with a password. The guidelines from Poth (2020) explained that the mixed methods design might be different in terms of number, methods, and period but justice should be the central concern. The researcher emphasized justice in the whole process of the study. This ranges from justice to the participants' time, space and context to their anonymity at the time of reporting the findings (Merten, 2009).

The researcher also followed the guidelines on the ethics of MMR, as explained by Preissle et al. (2015). For the authors, there are five considerations. In line with the considerations, first, she decided on appropriate qualitative and quantitative designs remaining in the ethical position. For this study, research questions one and two stipulated the quantitative design because it was intended to explore factors associated with employability in the ICT sector in Nepal among employers and graduating students and its existing level. Research question three was more focused on identifying the underlying causes for the prevailing gaps in employability in the ICT sector. So, the researcher chose the qualitative design in the second stage after determining the associated factors. She maintained ethics at all these stages and the level of employability. Second, the researcher maintained ethics in sampling as well as in the selection and involvement of the cases in each strand. She used a well-recognized formula to calculate the sample size of the quantitative strands. The researcher also provided ample opportunity and time for respondents to answer the questions of the survey. In qualitative strands, her initial plan was to interview the graduating students and employers only. The number was limited. As the researcher started the interviews, she realized the need for a larger sample size in qualitative strands, with additional insights from the related stakeholders. So, the researcher added academicians and policymakers to get their viewpoints. This was not planned earlier. In doing so, she was guided that with the ethics of the researcher, one cannot be limited to a certain number of cases. Getting into the depth of the issue is also a part of ethics for a researcher.

Third, this researcher maintained the ethics of the relationship with ‘no harm’ and fair behavior with every participant. Her prolonged engagement was just to get better and more in-depth data. The researcher did not hamper the participants’ time

and schedule. She waited for their time and availability. The researcher created an environment where participants voluntarily confirmed their convenient time. She was humble and polite during the data collection process. Fourth, the researcher maintained the ethics of data collection and its rigor in the process. Additionally, the researcher visited her participants several times. She checked and double-checked the information with her participants as to what they stated. The researcher also provided them with highlights of the transcribed documents for them to confirm their accuracy. Fifth, the researcher maintained the ethics of reporting the insights she gained with a balanced analysis of both strands.

Chapter Conclusion

The study was carried out sequentially in two phases. In the survey of the first phase, data were collected from 835 respondents, including 445 graduating students of ICT education and 390 employers in the ICT sector. The factors associated with employability were explored and analyzed. The gap in employability identified by the survey was explored further by using a case study with 19 participants, comprising 7 graduating students, 7 employers, 3 academicians, and 2 policymakers. The results obtained were presented in a joint display. The related reliability, validity, credibility, and ethical issues during both phases of the study were also discussed. The next chapter deals with the presentation of quantitative analysis.

CHAPTER IV

FACTORS ASSOCIATED WITH GRADUATE EMPLOYABILITY IN ICT SECTOR OF NEPAL

The factors associated with employability in the ICT sector are presented in this chapter. Before presenting the factors, graduating students' demography, their geographical and educational background, and reasons for their choice of ICT education are elaborated. Then, the positions of the employers, the number of employees in their companies, and the territory they are working in are also covered.

Respondents and Reason for Choice of ICT Education

Gender, ethnicity, and age are included under demographic variables in this study. Among them, gender was categorized into three attributes: male, female, and others. Ethnicity was categorized into four groups: Brahmins, Chhetri, Janajati, Dalit, and others. Likewise, the age attributes of the students were classified into two categories: 18-22 and 23 and above. The frequency and percentage of all these attributes are presented in Table 9.

Table 9

Demography of Graduating Students

Category of Variables	Frequency	Percentage
Gender		
Male	356	80
Female	89	20
Ethnicity		
Chhetri	85	19.1
Janajati	111	24.9
Dalit	11	2.5
Brahmins	238	53.5
Age		
18-22	257	57.8
23 and above	188	42.2

Table 9 shows that the majority of the students were male (N=356, 80%) and the rest female (N=89, 20%). This gives the impression that female participation in ICT education is still lower than that of males. This data also mirrored the national enrolment of female students in technical education in Nepal (14.07%) (MOE, 2017). The global scenario also does not have equal gender representation. In the U.S and Canada, only 28.8% of women were enrolled in ICT education (Deloitte Access Economic, 2019). The underrepresentation of females is reflected in the active labor force as well as in the ICT sector. In Nepal, 81% of the female population over 15 years are economically active. Among them, 0.5% work in the ICT sector (Labor survey 2017/18), which is comparatively very low. The low representation of females has also been explained as the digital gender gap (Deloitte Access Economic, 2019; IT Professional Australia, 2019).

Regarding ethnicity, the majority of the respondents were Brahmins 238 (53.5%), more than 50% of the total respondents, followed by Janajati 111 (24.9%), Chettri 85 (19.1%), and Dalits 11 (2.5%). It showed that the percentage of enrolment and continuation of study by Dalits (2.5%) in ICT education was very low compared to the other groups. It also reflects the lack of equitable opportunities for some groups, including the marginalized communities in Nepal. Ghimire (2018) and Gandhari (2021) claim that ethnicity and caste-based barriers are still key factors in inequitable participation in higher education. Regarding the age of the respondents, the majority (N=257, 57.8%) of the students belonged to the 18-22 years group.

Geographical and Educational Background

The respondents' residences were categorized as per their provinces and geographical features. Additionally, the types of schools were categorized into institutional/private schools and community/government schools. Data concerning

their residence (province representation, and geographical features), and school types (institutional, private) are presented in Table 10.

Table 10

Respondents' Geographical Location and Type of School Attained at SEE Level

Category of Variables	Frequency	Percentage
Province Representation		
Province 1	59	13.3
Madhesh Pradesh	42	9.4
Bagmati	220	49.4
Gandaki	43	9.8
Lumbini	52	11.8
Karnali	8	1.8
Sudur Paschim	20	4.5
Geographical Features		
Terai	173	38.9
Hills	264	59.3
Mountain	8	1.8
School Type		
Institutional/Private School	333	74.8
Community/Government School	112	25.2

The Table shows that the majority (N=220, 49.4%) of the graduating students were from Bagmati Province. The number and percentage of students from Karnali (8–1.8%) and Sudur Paschim (20–4.5%) are low, compared to Bagmati Province. Majority of ICT educational institutions are based in Bagmati provinces. In addition to Nepalese universities, most of the foreign university affiliated colleges with significant number of ICT graduates are in Bagmati province. Likewise, the majority of ICT graduating students were from the Hills (N=264,59.3%). The schools from where they completed the Secondary Education Examination (SEE) are also presented

in Table 10. The majority (N=333,74.8%) of them completed their SEE from institutional schools. This shows that the majority of students from private schools joined ICT.

Reason for Choosing ICT Education

Students can have their reasons for choosing ICT education. Some of them may be guided by interests and others may be influenced by their families. Yet others may choose due to their self-interest as well as families' interest. There can be other reasons, such as understanding the sector's importance, peer influence, etc. The choice of a particular education sector by a graduating student is essential information for analyzing employability (Mushi, 2020). Therefore, in this study, the respondents' reasons for choosing the ICT sector were assessed and presented in Table 11.

Table 11

Reasons for Choosing ICT Education

Reasons	Frequency	Percentage
Self Interest	275	61.8
Family Interest	117	26.2
Understanding the importance of the sector	93	20.7
Peer Pressure	23	5.1

The study showed that the majority (N= 275, 61.8%) of graduating students had chosen ICT as their education with their self-interest. Self-interest when choosing higher education or a career is considered important for personal growth and success in the career (Powell, 2009). This also showed that ICT graduates have understood the scope of ICT sector as a lucrative industry. A few (N=117, 26.2%) students had studied ICT due to their family interests and peer pressure (N=23, 5.1%). Such influence can have negative consequences for the graduating student (Mtemeri, 2020; Kaur, 2020).

Employers, their Position, and Working Territory

In many cases, Chief Executive Officers (CEOs) and Human Resources Managers (HR) are responsible for the recruitment and selection of employees. Therefore, in this study, they were also considered as employers of fresh graduates. In Table 12, their positions, employee number in their companies, and their working territory are presented.

Table 12

Employers' Background

Category of Variables	Frequency	Percentage
Position of Respondents		
CEO	154	39.49
Founder	85	21.79
Co-founder	68	17.43
HR	83	21.29
Directors/Managers/Head		
Number of Employees		24.9
0-50	153	39.23
50-100	137	35.12
100-200	37	9.48
200-500	58	14.87
500 and above	5	1.30
Working Area		
Nepal only	129	33.07
Outsourcing outside Nepal	137	35.13
Both (Nepal and outside Nepal)	124	31.80

Table 12 presents data about the position of the respondents–founders, co-founders, CEOs, and HR managers who participated in the survey and provided their views on graduate employability. Out of them, the majority were CEOs (N=154,

39.49%). Likewise, about two-thirds of the companies had employees ranging from 1 to 100. This indicates the existence of numerous small and medium-sized ICT companies/organizations that employ ICT graduates in Nepal. The working territories of the companies/organizations vary from Nepal to abroad. About two-thirds of the companies outsourced from other countries. The respondents reported working for the following countries: the USA, Europe, Australia, Canada, Japan, Singapore, Hongkong, China, Indonesia, Philippines, Malaysia, Magnolia, South Africa, India, Srilanka, and Bhutan.

Factors Associated with Employability

One of the objectives of the study was to identify the factors associated with graduate employability in the ICT sector, incorporating the views of both employers and graduating students. For this purpose, the data from the field were entered into the SPSS software and analyzed through exploratory factor analysis. In the process, the principal component analysis is used to explore the factors, followed by varimax rotation. However, before principal component analysis was run, it was necessary to know that data were suitable to run the test, and hence, safety checks were made. The conditions of the safety check (Cohen et al., 2018) and the results of this study are presented in the two columns of Table 13.

Table 13

Conditions and Results of Safety Check in the Process of Principal Component Analysis

Conditions	Results of this study
1. Data should be on interval scale of five-to-seven- point Likert scale.	Six-point Likert scale was used in this study.
2. Sample size of 300 is good.	Sample size was 835 for this study.
3. Retention of items loading must be greater than 0.30.	Item loading was 0.50.

4. Retention of dimension having Eigen values must be greater than 1.	It was 3-factor, with an Eigen value greater than 1.
5. Communalities of average extraction must be greater than 0.5.	Communalities of average extraction was 0.654.
6. Kaiser-Meyer Sampling adequacy must exceed 0.5.	It was 0.967 in this study.
7. Retaining factor of at least three items is needed to consider it valid.	Items under each factor of this study were from eight to eleven.
8. Inter-item correlation should be 0.2 to 0.4.	Co-efficient of over 0.30 in all the variables.

As presented in Table 13, the first condition was that data should be of five-to-seven Likert points. In this study, it was six points. The second condition was that the sample size should be more than 300 to be acceptable (Tabachnick & Fidell, 2013; Field, 2009). In this study, the sample size was 835, which satisfied the second condition. The third condition was that the retention of the item loading should be greater than 0.30. Item loading of this study was 0.50 (Costello & Osborne, 2005), which satisfied the third condition. Correspondingly, the fourth condition positioned the retention of the dimension having Eigen values of greater than one (Field, 2009; Yong & Pearce, 2013). In this study, the factors had Eigen values of more than 1. Likewise, in the fifth condition, the average extraction should be more than 0.50 (Tabachnick & Fidell, 2007). The result of commonalities of an average extraction was 0.654, satisfying the condition. To satisfy another condition, Keiser-Meyer-sampling adequacy must be 0.60 and above (Field, 2009; Kline, 1994). In this study, it was 0.968, which satisfied the sixth condition.

The seventh condition was that the retaining factor required at least three items (Kline, 1994). When factor analysis was run, items under each factor were eight to eleven. Therefore, the seventh condition was also satisfied. Likewise, the inter-item

correlation was required to be 0.2 to 0.4 (MacCallum and Tucker, 1991). This study had a co-efficient of over 0.30 in all the variables. By this, all the underpinning conditions of factor analysis (Cohen et al., 2018) were satisfied in this study. After the conditions of PCA were satisfied, the analysis was performed with the presentation of the result of Kaiser- Meyer-Olkin (KMO) and Bartlett's test of sphericity, explanation of total variance, scree plot, and rotated component matrix, as follows.

The KMO extent of sampling adequacy and Bartlett's test of sphericity resulted in a 0.967 value and a substantial level of 0.000, respectively. The KMO index ranges from 0 to 1, with 0.50 recommended as the lowest value for decent factor analysis (Tabachnick & Fidell, 2007). These findings indicated the good sampling adequacy (Field, 2018) of 45 items. KMO and Bartlett's test for measures is presented in Table 14.

Table 14

KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.967
Bartlett's Test of Sphericity	Approx. Chi-Square	21627.105
	Df	351
	Sig.	.000

An initial principal component analysis was conducted to compute Eigen values for each component in the data. An Eigen value greater than one rule (Kaiser, 1958) (Table 14 and scree test Figure 4) representing a plot of Eigen values against the factors in descending order was used to determine an appropriate number of factors to retain. An analysis of the 45 items of the questionnaire resulted in three factors being retained, with Eigen values greater than 1, accounting for 70.33% of the total variance explained (Table 15). Items with loadings greater than ±0.50 with the

factor in question were used to characterize the factor solutions. The resultant factors were descriptively labelled as indicated in Table 15.

Table 15

Total Variance Explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.94	59.035	59.035	15.94	59.035	59.035	7.368	27.288	27.288
2	1.641	6.078	65.113	1.641	6.078	65.113	5.958	22.066	49.354
3	1.409	5.219	70.333	1.409	5.219	70.333	5.664	20.978	70.333
4	.765	2.834	73.166						
5	.682	2.526	75.692						
6	.578	2.143	77.835						
7	.547	2.025	79.860						
8	.493	1.824	81.684						
9	.465	1.722	83.406						
10	.443	1.639	85.045						
11	.402	1.489	86.534						
12	.371	1.374	87.908						
13	.356	1.319	89.227						
14	.329	1.219	90.446						
15	.294	1.091	91.537						
16	.284	1.051	92.588						
17	.259	.960	93.548						
18	.251	.928	94.476						
19	.214	.791	95.267						
20	.210	.777	96.044						
21	.194	.717	96.761						
22	.189	.698	97.459						
23	.180	.666	98.125						
24	.169	.658	98.783						
25	.128	.635	99.418						
26	.119	.582	100.000						

Extraction Method: Principal Component Analysis.

The scree plot in Figure (4) reveals a break after the third factor. The steep slope shows the larger factor while the gradually decreasing factor presents the rest of the variables that have eigenvalues lower than one.

Figure 4

Scree Plot

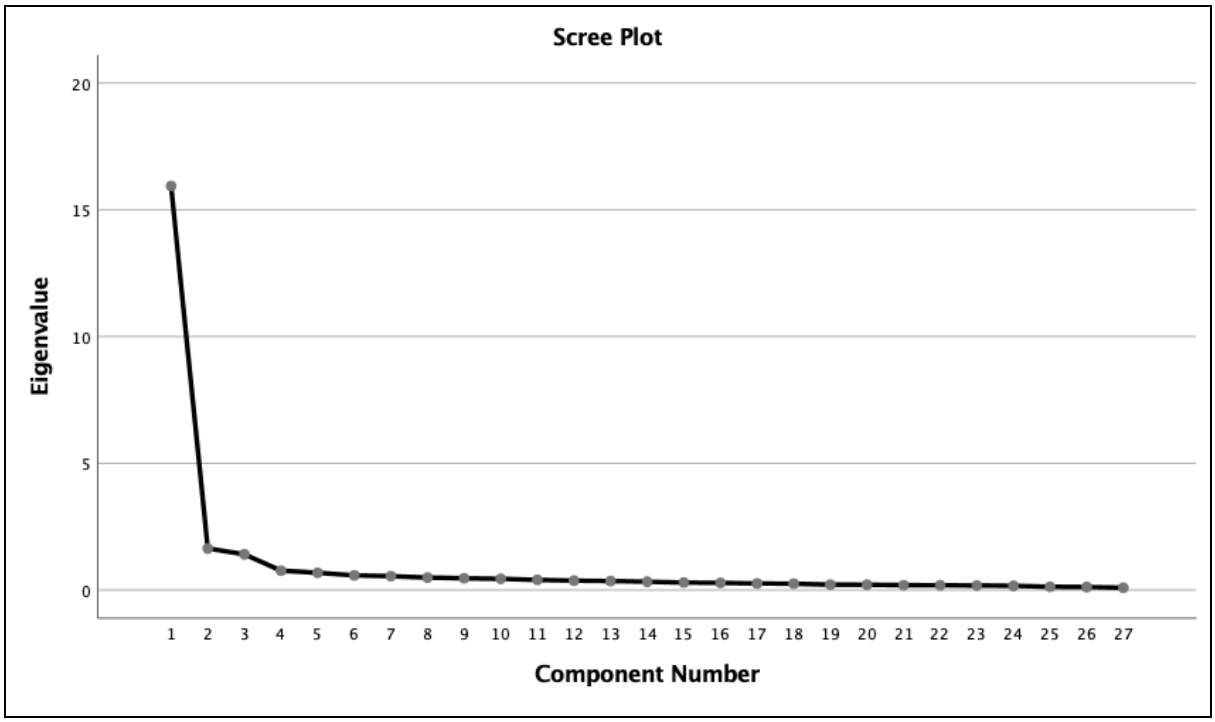


Table 16

Rotated Component Matrix

Rotated Component Matrix[a]			
	Component		
	1	2	3
Technological capabilities	**.832**	.304	.214
Digital transformation awareness	**.776**	.265	.290
Learning aptitude	**.731**	.347	.376
Process management	**.723**	.186	.406
Acumen	**.712**	.431	.321
Software skills	**.667**	.231	.450
Time management	**.631**	.393	.285
Hardware skills	**.603**	.251	.337
Analytical skills	**.583**	.433	.324

Rotated Component Matrix[a]			
	Component		
	1	2	3
Internship experience	**.557**	.300	.316
Calmness	.330	**.798**	.151
Ethical		**.749**	.466
Empathy	.290	**.734**	.195
Confidence	.430	**.729**	.182
Stress management	.273	**.715**	.292
Accountable	.281	**.682**	.382
Self-discipline	.358	**.675**	.329
Passionate	.424	**.634**	.296
Adaptability	.162	.276	**.812**
Documentation skills	.327	.254	**.781**
Communication skills	.390	.342	**.674**
Project management	.482	.193	**.670**
Collaboration skills	.423	.321	**.655**
Teamwork	.454	.320	**.624**
Presentation skills	.428	.230	**.614**
Excellent verbal English	.274	.357	**.611**

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.[a] a. Rotation converged in 7 iterations

Factor one was labeled core skills. There were ten items that loaded on this factor, with loadings ranging from 0.832 to 0.557 (explained variance 59.03%). The top item in the factor was technological capabilities. Factor one included characteristics of technical capabilities, digital transformation awareness, learning aptitude, acumen, software skills, time management, basic hardware skills, analytical skills, and internship experience.

Factor two was labelled personality attributes, with eight items that loaded on it, with the loadings ranging from 0.798 to 0.634 (explained variance 6.07%). The top item in the factor was calmness. Factor two included characteristics of calmness,

ethics, empathy, confidence, stress management, accountability, self-discipline, and passion.

Factor three was given the label of organizational adaptability skills, with eight items loaded in it, with loadings ranging from 0.812 to 0.611 (explained variance 5.21%). The top item in the factor was adaptability skills. Factor three characteristics were adaptability, documentation skills, communication, project management, collaboration, teamwork, presentation, and excellent verbal English skills.

Three-factor Component Analysis

This study explored graduate employability in the ICT sectors with three factors: Core skills, personality attributes, and organizational adaptability skills. The factors are explained in separate headings below.

Core skills

Graduate students have to enter the market with the skills learned in their higher education. The core skills are often considered central to their respective disciplines (Tomlinson & Holmes, 2017). This study also showed that out of 70.33 % of total factor loadings, 59.03% were represented by core skills. It shows that the graduates are expected with a higher level of those skills to be employable. Core skills are articulated in various names such as key, transferable, essential, and functional skills (e.g., Sehgal, 2018, Moore, 2010; Vasudevan, 2021). The name suggests that core skills extend beyond the acquisition of discipline-related knowledge. Consequently, core skills develop agility and may not be limited to enhancing one's ability (Flectcher-brown, 2015). Hence, core skills are acquired at every stage (Pinto, 2017) and are not predominantly developed at a level of higher education (Tholen, 2019).

Altogether, ten items were loaded in core skills in this study. They were technical capabilities, digital transformation awareness, learning aptitude, process management, acumen, software skills, time management, basic hardware skills, analytical skills, and internship experience. These are considered fundamental skills in ICT for fresh graduates. Each of these components obtained from the major of this study loading has been discussed further.

Among the ten components, technical skills are prerequisites for ICT graduates while entering the workplace. Moreover, striving for technical skills to gain knowledge is important in the ICT sector (Sehgal, 2018). In the process of learning these skills, students gain technical capabilities. This study also showed that technical capabilities are one of the important components of core skills (factor loading 0.832). Employers expect fresh graduates to possess technical capabilities in the competitive labor market (Andrewartha & Harvey, 2017). Specifically, the expectation of employers includes several technical skills that may vary according to the job type. In general, technical capabilities are required for fresh graduates to be employable. These are very important in a rapidly expanding technological era because, without them, there can be skill shortages and gaps in the technology sector (Suleman, 2018). To mitigate such gaps, the conscious act of learner supports in embedding employability skills is necessary (Fraser et al., 2019). Such conscious acts of support deepen the knowledge and enhance the technical competencies of graduates. They also equip fresh graduates with a tangible knowledge base, where the graduates can develop an ability to have updated learning as required on specific technological changes.

Besides the technical capabilities, digital transformation awareness in fresh graduates is equally important. The importance can be traced because there is

widespread diffusion of digital technology in the Industrial revolution 4.0. This may be why understanding the phenomena of digital transformation is an important aspect of employability. Its relevance is often linked to the employability of fresh graduates. This study also explored the importance of digital transformation awareness (factor loadings .776) as one of the major constructs of graduate employability in the ICT sector in Nepal. Hanelt et al. (2021) also linked digital transformation awareness with malleable organization designs and the digital ecosystem. In a part of the ecosystem, fresh graduates enhance their knowledge and help organizational growth and change. Moreover, digital transformation also fosters cultural change and builds capacities for adaptation in the ecosystem (Gaiardelli et al., 2021). The importance of digital transformation is also traced to the self-learning process. Hence, digital transformation awareness is considered a major component required for the development of core skills necessary to be learned in the ICT sector.

The third component of core skills is learning aptitude. It comprises the evolutionary characteristics of an individual, which support the process of knowledge acquisition. In this rapidly changing ICT world, graduates who can learn new skills quickly are in demand. Studies (e.g. Mezhoudi et al., 2021; Moore, 2010; Vasudevan, 2021) have shown that organizations need candidates who can continuously develop and update their skills. This may be why this study showed that learning aptitude is one of the important components (factor loadings .731) of core skills in ICT sector's graduate employability. In the ongoing transformation of the fourth industrial revolution (industry 4.0), such skills support graduates in their sustainable career development because graduates can start exploring on their own.

The other component identified in this study is acumen. Acumen represents crucial skills for technology graduates to boost their technical capabilities and other

soft skills (McEwan, 2013). Acumen is also regarded as a new literacy for sustainable employment and a pre-requisite for developing all other skills, including meta-competencies necessary in the ICT sector (Ustav, 2018). Acumen is also important because it supports graduates in the process of decision-making (Baharoom et al., 2013) in the organization they work in. In this study, acumen is loaded as one of the major components of the core skills, with a loading value of .712.

The other component, such as software skills, generally refers to a stronger programming foundation. The skills are important in developing programs and software. Particularly, basic software skills enable fresh graduates to understand and adapt to the changing world and thus promote the employability potential of fresh graduates (Anicic & Buselic, 2021). This study also showed that software skills are part of the core employability skills of the ICT sector (factor loading 0.667) for fresh graduates. This may be the reason that software skills are also included in the university curriculum of Nepal. In reviewing the curriculum, this researcher found software such as Python, Java, etc. have been included in the curriculum of Nepalese universities. Such basic softwares are foundational for the graduates to learn updated and advanced software.

Along with software skills, time management is one of the core employability skills (Pan et al., 2018; Pinto & Ramalheria, 2017; Prikshat, 2019). In this study, time management has become a component of core skills (factor loadings 0.631). The essence of time management is not only for planning but also accomplishing specific tasks within deadlines. Particularly, in the ICT sector, meeting deadlines is very critical.

Another component explored in this study is basic hardware skills, which refer to the physical operation of devices and the connection of machines to networks.

These hardware skills are in high demand because they are part of the ICT infrastructure. Basic hardware skills are expected from all fresh graduates. The skills are expected to address the general maintenance needs in their jobs. They are also relevant because many small and medium IT industries cannot recruit specific hardware experts for basic hardware-related work. Specialized human resources cannot be afforded in these organizations in Nepal, where there are numerous small and medium-scale industries (IBN, 2016). This study also showed with factor loadings of .603 that basic hardware skills contribute to the core skills.

The results of the study reveal that software and hardware skills are very important for ICT graduates to reflect employability skills. However, when these skills are accompanied by analytical skills, employees can work with competence. This is why analytical skills have been recognized as desirable employability skills in the ICT sector (e.g. Nghia, 2018; Abbasi, 2018; Baird, 2019). This study also revealed that analytical skills contribute to core skills with factor loadings of 0.583. These skills have to be part of teaching-learning (Chinzer & Russo, 2018; Misra & Khurana, 2018) because they support ICT graduates' entry into the job market. In the competitive ICT sector, it is important to understand and analyze the sphere and use appropriate skills to solve everyday problems (Abbasi, 2018).

To equip graduates with the necessary skills, the internship provides work experience to students while studying. It is one of the key predictors that affects the career adaptability of graduates (Inceoglu et al., 2019; Pan et al., 2018). Internship can serve as the external stimulus for graduates to cultivate the required ability and supports students to adapt, even when there are unexpected changes in the organization. They also learn to respond to the disequilibrium between the work they perform and their theoretical study. In addition, an internship supports graduates in

building a proactive personality necessary for the job market (Knouse & Fontenot, 2008). This study also revealed that internship experience contributes to the core skills of employability, with factor loadings of 0.557.

Personality Attributes

Personal attributes for employability are important and their relevance has been discussed. For example, Knight and Yorke (2003) felt it pertinent for developing competencies for graduates. Tymon (2013) presented the importance of personal attributes for reciprocating employability constructs. Yorke (2006) encapsulated personal attributes to enlarge the degree of employability. Additionally, from the perspective of employers, Lees (2002) stated that personal attributes are vital to prepare employable graduates. With the consolidated attributes, employers value the graduates in the recruitment process (Finch et al., 2016). This study also showed that out of the total loadings, more than 6.07% are represented by personality traits. The factor was loaded with eight components: calmness, ethics, empathy, confidence, stress management, accountability, self-discipline, and passion. These components are discussed below.

Calmness has been explored as one of the components because uncertainty and changes are challenges in the modern world (Misra & Khurana, 2018). The employees may face pressure and stress with deadlines in their work. Knight and Yorke (2004) found calmness necessary to cope with pressure in the workplace, particularly for entry-level employees. This study also showed that calmness is one of the important components of personality attributes with factor loadings of 0.798. This shows that calmness is crucial in the industry amid ongoing and unpredictable changes.

Along with calmness, ethical values are regarded as key attributes that graduates should possess (CMI, 2018). Particularly, ICT employees have an ethical obligation because they are supposed to follow principles, standards, and guidelines strictly. These principles guide their behaviors in performing their work (Seleim & Khalil, 2011). This may be a reason why ethics has been explored as one of the important personality attributes in the ICT sector with factor loadings of 0.749.

Another component explored in the personality attribute is empathy. Empathy is the ability to understand others' emotions and perceptions. It supports nurturing relationships (Synard & Gazzola, 2018) and can be one of the important aspects of the employability of entry-level graduates because it is linked directly with positivity (Maxwell & Armellini, 2018). Being empathetic, one can support others and the process builds trust and respectfulness among the members of an organization (Meehan & Howelles, 2019). Such trust and respectfulness are significant at the entry-level position because new workers may require emotional support when they join an organization. In this study, empathy is loaded (0.734) as one of the key components of personality attributes.

One more component explored within personality attributes is confidence. Confidence is the situational behavior of an individual and contributes to sustainable employability (Tymon et al., 2020). With confidence, graduates do not have hesitancy, which is normally a barrier for them at the entry level (Beaumont et al., 2016). Confidence can also be linked to employment self-efficacy, which is necessary for securing and sustaining a job (da motta Veiga & Turban, 2018). It is traced to an individual's characteristics of maturity and preparedness in the career. This could be a reason why confidence in this study has been explored as an important component with a factor loading of 0.729.

Another component explored in personality traits is stress management, which has a direct effect on productivity and is thus one of the major components associated with employability (Ornellas et al., 2019). Stress management skills are expected in the workplace because they make employees content and promote productivity at work. It is much crucial for entry-level graduates (Ma & Bennett, 2021) because they are in the process of learning the organization's culture, and the learning process may be painful on some occasions. This study also revealed stress management to be a key component of personality attributes (factor loadings of 0.715).

Along with managing stress, being accountable is a highly valued skill in the workplace that fuels a successful organization because it supports employees to assume responsibility, by which they can accomplish goals. In addition, accountability promotes individuals' performance and accelerates success in the workplace (Jackson, 2015). In this study, the component accountability is one of the factors of personality attributes with loadings of 0.675.

Self-discipline was explored as another component of personality attributes. Self-discipline promotes the perseverance of an individual in achieving goals and with it, one can be successful in one's endeavor. Employers expect fresh graduates to be equipped with self-discipline because it makes them dedicated to translating their ideas into action (Sodipo, 2014). This study also showed that self-discipline is an integral component of personality attributes with its loadings of 0.675.

Along with self-discipline, employees can be successful in an organization when they are passionate. Passionate individuals are appreciated in the workplace because passion supports work engagement and job performance. Those who can demonstrate passion are regarded as highly motivated. Therefore, passionate and up-to-date graduates are in high demand (Hu et al., 2021). In this study, passion is loaded

as an important component of personality attributes with its factor loading of 0.634, revealing being passionate as a key trait to being employable in the ICT sector in Nepal.

Organizational Adaptability Skills

Change is inevitable, and the ICT sector cannot be an exception. In the era of industry 4.0, digital transformation is a buzzword. The transformation is possible through the application of technology. In the process, adaptation to new technology is the highest. Consequently, digital transformation becomes the key to success in an organization (Sony & Naik, 2022). Therefore, organizational adaptability skills in the changing context are expected in the workplace in the ICT sector. This study also showed that out of the total loadings of factors associated with employability in the ICT sector, explained variance at 5.21% is represented by organizational adaptability skills (Table 15) and consists of eight components: adaptability, documentation skills, communication skills, project management, collaboration, teamwork, presentation skills, and excellent verbal English. Each component of this study which encompasses the major loadings of the factors is discussed as follows.

The adaptability of an employee is one of the eight components. Adaptability is a highly demanded skill amidst the uncertainties, multi-culture environment, and changing scenarios of the ICT sector. It is considered a key to the process of education to work transition and fostering and in the growth of companies (Succi & Canovi, 2019). This study also showed that adaptability is the essence of graduate employability in the ICT sector in Nepal, with factor loadings of 0.812. It reveals that both graduating students and employers highly value adaptability, particularly in accommodating new technologies in organizations.

The other component of documentation skills is important in the ICT sector. Work outputs can be affected if the processes of work are not properly documented. This is relevant because human resources in the ICT sector are expected to follow the sequence of steps properly to add value to work output and make the collaboration process effective (Stadtler et al., 2017). This study also revealed the importance of documentation skills for employability, with factor loadings of 0.781. It shows that documentation skills play an important role in graduate employability in the ICT sector.

Communication skills are very important employability skills. Several studies (William et al., 2019; Baird & Paryitan, 2019; Tymon, 2013) have explained their significance. Other studies (e.g. Kamil & Muhammad, 2021; Guardia et al., 2021) have shown that effective communication skills for entry-level graduates are a must in a different context. Lack of communication prevents skilled graduates from being able to express their knowledge and ideas. This study also shows communication skills as an important component of the employability of ICT graduates, with factor loadings of 0.674.

Project management skills are required intensively in the ICT sector. Employers consider it an important employability skill for entry-level graduates (Hollister et al., 2017). Fostering effective project management skills for entry-level graduates is also called a gate pass to employment (Smith & Worsfold, 2015). In this study, project management is loaded as one of the important components of organizational adaptability, with factor loadings of 0.670. It shows that project management skills contribute to employability in ICT.

Along with project management, collaboration is a significant component of employability. Collaboration supplements technical skills for the effective

implementation of projects (World Economic Forum, 2016). Collaboration skills are expected even at the entry-level (Tomilson, 2015). This study also shows that collaboration skills contribute to organization adaptability, with factor loadings of 0.655. Additionally, teamwork is considered an important component of employability skills (McManus & Rook, 2019). It is deemed a key capability from the industry's perspective (Kornelakis & Petrakaki, 2020; Succi & Canovi, 2019). Employers seek candidates with teamwork skills even at the entry level (Fajaryat et al., 2020). This study also showed that teamwork is an important component of organizational adaptability, with factor loadings of 0.624.

Likewise, the ability to present effectively is a vital employability skill. Better presentation skills obviously enhance the performance of an employee (Baird & Parayitam, 2019; William et al., 2019). From the employers' perspective, the best candidates are selected based on their qualities of creating, delivering, and presenting effectively (McMurray et al., 2016). The result of the study shows that the presentation skills component is a significant attribute of employability, with factor loadings of 0.614.

Along with presentation skills, verbal English competencies are emphasized in industries working with global business, where English is used as the first language. The demand for verbal English competencies are high in the global industry (Vu, 2019). The ICT industry also expects its employees to have excellent verbal English skills to communicate effectively with global clients (Kamil & Muhammad, 2021). This study also established the importance of excellent verbal English skills as a component of graduate employability in the ICT sector in Nepal, with a factor loading of 6.11. This revealed that English communication is an important aspect of the ICT sector.

Graduating Students' Preparedness and Employers' Expectations

Principal component analysis was presented in an earlier section taking aggregated data from both students and employers. The purpose was to explore the construct of employability in ICT education in Nepal. However, there could be a different result if PCA was conducted separately for employers and students because each group has its own priorities. Therefore, PCA was run on the students' data first and employers' data thereafter. Before PCA was run, its assumptions were tested and satisfied (Annex I, Table 21). The result explored three factors associated with employability when PCA was run on students' data and five factors on employers' data. In the case of students' data, the three factors were foundational skills, personal attributes, and versatility skills. Of these, factor one was foundational skills with an explained variance of 62.10% (Annex I, Table 22 & 23). Factor one includes hardworking nature, collaboration skills, flexibility, analytical skills, teamwork, adaptability, result-oriented attitude, logical reasoning, and critical thinking. The second factor was personal attributes, with an explained variance of 6.04%. The characteristics included in factor two are calmness, ethics, confidence, empathy, stress management, accountability, and passion. The third factor involved versatility skills, with an explained variance of 4.79%. Factor three's characteristics were excellent verbal English, time management, prioritization skills, digital transformation, technological aptitude, presentation skills, and internship experience.

In the employers' data (Annex II, Table 24, 25 & 27), five factors were obtained. They were fourth industrial revolution skills, dispositional skills, performance management skills, organizational competencies, and technical skills. Among them, in the fourth industrial revolution skills, nine items were loaded with an explained variance of 48.29%. Factor one included the characteristics of critical

thinking, logical reasoning, problem-solving, innovativeness, creativity, analytical nature, acumen, adaptability, and result orientation. Factor two was dispositional skills with an explained variance of 6.60%. Factor two included the components of ethics, confidence, calmness, empathy, flexibility, accountability, stress management, and passionate and hardworking nature. Factor three was performance management skills with an explained variance of 4.83%. The components of factor three were collaboration skills, teamwork, ownership, communication skills, workplace learning, and internship experience. Factor four was technical skills with an explained variance of 3.86 %. Its components were technical capabilities, technical aptitude, software skills, and digital transformation. Factor five was organizational competencies skills, with an explained variance of 3.63 %. The components of factor five were excellent writing skills, facilitation skills, presentation skills, and project management.

The separate PCA on employers' and students' data shows that there were some differences among the components in the views of graduating students and employers on employability. Attributes such as problem-solving tendency, innovativeness, creativity, acumen, ownership, workplace learning, communication skills, technical capabilities, software skills, excellent writing skills, and project management were valued much by employers, whereas prioritization skills were valued by students. The result shows that the attributes of problem-solving, innovativeness, creativity, acumen, ownership, workplace learning, communication skills, technical capabilities, software skills, excellent writing skills, and project management were not prioritized much by the universities.

Employability Constructs across Students and Employers

To explore the potential difference across types of respondents (employers and students) in their view of employability constructs of core skills, organizational

adaptability skills, and personality attributes, the data concerning the types of respondents and their views on employability were analyzed through mean, standard deviation, t-test and effect size calculation and presented in Table 17.

Table 17

Employability Construct across Students and Employers

Employability construct	Type of respondent	N	Mean	Std. deviation	t value	*p*-value Sig. (2-tailed)	Effect Size
Core skills	Graduating students	445	3.96	0.99	1.36	0.000	0.95
	Employers	390	4.72	0.48			
Organizational adaptability skills	Graduating students	445	3.94	1.09	0.66	0.000	0.95
	Employers	390	4.05	0.51			
Personality attributes	Graduating students	445	3.70	1.09	1.63	0.000	0.99
	Employers	390	4.60	0.65			

The mean value presented in Table 17 indicates that employers' expectation from fresh graduates at their work is more than what is offered by graduating students. Out of the three constructs of employability, the mean value of core skills (4.72) is higher than that of the other two factors. The test results on core skills (*t*-test= 1.36, *p*=0.000), personality attributes (*t*-test= 1.63, *p*=0.000, and organizational adaptability skills (*t*-test= 0.66, *p*=0.000) presented in Table 17 showed statistical difference in the view of the employers and the graduating students on the factors associated with employability. In all the components (core skills, organizational adaptability skills, and personality attributes), employability, as viewed by employers, was different from that of graduating students. Employers located the employability

constructs in stronger expectations than on offer from graduating students. However, both graduating students and employers viewed that the core skills of graduating students were stronger than organizational adaptability skills and personality attributes. Additionally, G* power analysis showed that the effect size of core skills (0.95), personality attributes (0.99), and organizational adaptability skills (0.95) were very strong (Faul et al., 2007).

Level of Employability of Graduating Students

In this section, the analysis of the level of employability of graduating students has been presented. The basis of the analysis of measuring the level of employability was the mean and standard deviation of each factor. The mean of each factor was obtained by calculating the mean of all the retained items obtained from PCA. Additionally, the mean interval of each factor was calculated by dividing by 3 (Polit & Hungler, 1992) to categorize the level of employability as high, medium, and low.

In analyzing the level of employability, a standard competency scale was also used (Langlois & Lapointe, 2010). The scale consisted of typologies in which the score from 1.0 to 3.5 indicated “traces”, 3.6 to 4.4 indicated “emergence”, 4.5 to 4.8 “presence”, 4.9 to 5.5 “consolidation” and 5.6 to 6.0 indicated an “optimization” level. The mean value of each attribute (Table 18) was taken as the score for the scale. The typologies helped well to examine the level of employability attributed to graduating students by employers.

Table 18

Level of Employability of Employers and Graduating Students

Employability construct	Type of respondent	High N(%)	Medium N(%)	Low N(%)	N	Mean	Competency Scale
Core skills	Graduating students	29(6.5)	252(56.6)	164(36.9)	445	3.96	Emergence
	Employers	0 (0)	58(14.9)	332(85.1)	390	4.72	Presence
Personality attributes	Graduating students	64(14.4)	251(56.4)	130(29.2)	445	3.70	Emergence
	Employers	11(2.8)	232(59.5)	147(37.7)	390	4.60	Presence
Organizational adaptability skills	Graduating students	50(11.2)	225(50.6)	170(38.2)	445	3.94	Emergence
	Employers	3(0.8)	296(75.9)	91(23.3)	390	4.05	Emergence

1.0 to 3.5= Traces; 3.6 to 4.4= Emergence;4.5 to 4.8 = Presence; 4.9 to 5.5= Consolidation; 5.6 to 6.0= Optimization (Langlois & Lapointe, 2010)

Table 18 shows that on the core skills, the majority of the graduating students (N=252, 56.6%) perceived their level as the medium category, whereas most of the employers considered it low (N=332, 85.1%). Moreover, concerning the competency scale, the result shows that on core skills, graduating students were at the emergence scale, but employers categorized them under the presence scale. It means that in students' view, core skills have just emerged but are not well presented, and in employers' view, core skills have presented themselves among graduates but have not been consolidated to reflect at work.

On the personality attributes, a majority of the graduating students (N=251, 56.4%) and employers (N= 232, 59.5%) perceived their level under the medium category. While comparing the results with the competency scale, graduating students viewed themselves at the emergence level but employers categorized their level as

presence. It means that the majority of the graduating students have understood they are not competent vis-a-vis personality attributes, as demanded by employers.

On the organizational adaptability skills, the majority of both graduating students (N=225, 50.6%) and employers (N=296, 75.9%) viewed students' employability as medium. Similarly, when results are compared with the competency scale, both graduating students and employers viewed their organizational adaptability skills as just emerged. This shows that gap was indicated by both graduating students and employers and that students' employability was not reflected to the expected level. The result was further substantiated by the views of employers. For them, the graduating students were at the presence level, yet to be consolidated.

Workplace Learning

Workplace learning such as internships, engagement in work while studying and related training attended by graduating students are essential aspects of employability constructs (Pan et al., 2018). With their importance, data concerning them were analyzed as presented in Table 19.

Table 19

Internship and Work Experience of Graduating Students

Category of Variables	Frequency	Percentage
Internship		
Yes	167	37.5
No	278	62.5
Period of internship		
Less than a month	54	32.33
1-3 months	89	53.29
3-6 months	16	9.58
6 months and above	8	4.80
Working in addition to study		
Yes	123	27.6

No	322	72.4
Any additional training		
Yes	142	31.4
No	303	68.1

This study showed that the majority (N=278, 62.55%) of graduating students did not participate in any internship program, although there is a provision for internship in the curriculum of ICT education (IOE, 2019; School of Engineering, 2016; MWU, 2018; FWU, 2019; PU, 2019; Purbanchal University, 2019). An internship provides an opportunity for a professional learning experience that offers a meaningful contribution to one's employability (Inceoglu et al., 2018; Pan et al., 2018). Importantly, many graduating students (N=123,27.6%) were working while studying. Likewise, about one-third (N=142,31.4%) of graduating students had an opportunity for additional training.

Work-based training such as internship, its period, and satisfaction were other concerns of the study. Hence, data concerning these variables were analyzed and presented in Table 20.

Table 20

Work-Based Training from Employers

Category of variables	Frequency	Percentage
Intern Recruitment		
Yes	218	55.9
No	172	44.1
Internship Period		
Less than a month	67	30.73
1-3 months	120	55.05
3 months and above	31	14.22
Satisfaction with fresh graduate's work		
Yes	138	35.39

No	252	64.61
Reasons for dissatisfaction		
Inadequate Technical Skills	83	32.94
Less Practical Knowledge	140	55.55
Focused on going abroad	29	11.51
Reasons for Satisfaction		
Aptitude to learn	26	18.84
Quick Learner	37	26.82
Creative	18	13.04
Energetic	13	9.42
Hardworking	23	16.66
Talented	21	15.22

The study showed that more than one-third of the employers (N=172, 44.1%) did not provide internships to the graduating students. This implies that many students did not get the opportunity to learn through an internship. Results also showed that the majority of the employers (N=120, 55.05%) provided internship opportunities for 1-3 months. However, the majority of them (N= 252, 64.61%) were not satisfied with the work of fresh graduates and many (N=140, 55.55%) of them viewed that inadequate practical skills of graduates were one of the reasons for the dissatisfaction. Employers also appreciated the quick learning skills (N=37, 26.82%) of the fresh graduates of THE ICT sector in Nepal. Overall, practical skills and workplace learning opportunities were not adequately provided to ICT graduates in Nepal. Consequently, many graduating students lacked hands-on experience.

Chapter Conclusion

The chapter began with a description of the statistical analysis. The result explored three factors (core skills, personality attributes, and organizational adaptability skills) that explained the employability construct of the ICT sector in Nepal. Out of these, core skills are a key factor in the view of both employers and

graduating students. The statistical analysis also indicated differences in the views of employers and graduating students on the level of employability in Nepal, with the level of graduating students being at the presence and emergence levels, respectively, and yet to be consolidated. Another important gap explored in this analysis is the gap between the priorities of the attribute set by employers and graduating students. For example, attributes such as problem-solving, innovation, creativity, etc., were valued by employers, whereas prioritization skills were valued by graduating students. This indicated the need for exploration of reasons for the existing gap in graduate employability in the ICT sector, to which the next chapter is dedicated.

CHAPTER V

REASONS BEHIND THE GAPS: ICT STAKEHOLDER'S REFLECTION

In the previous chapter, this researcher concluded that graduate employability in the ICT sector is yet to meet employers' needs and expectations. Based on this understanding, she raised a key question: Why has the ICT sector in Nepal been entangled in employees' skills and/or abilities and the employers' needs or demands? the researcher thus interviewed the research participants to ascertain their opinions, perspectives, and/or understanding in response to the second research question: Why/How does the employees' ability concerning ICT not align with the employers' expectations? She approached the selected ICT graduates who worked in the ICT sector, the employers concerned, academicians involved in producing ICT graduates, and ICT curriculum designers for an interview to ascertain their opinions concerning the aforesaid question. The researcher noted their opinions and experiences and developed six major themes therefrom, viz., 1. Inadequate curriculum, 2. Inadequate practicum 3. Insufficient work-based learning 4. Less engagement in extracurricular activities (ECA) 5. Weak university-industry relations, and 6. The limited engagement of students in building employability skills. The data under each theme are presented and discussed in the following sections.

Inadequate Curriculum

The curriculum is one of the components responsible for ensuring increased employability. Employability consists of knowledge, skills, attitudes, values, and beliefs that essentially promote employees' confidence and trust in themselves about the employment (McQuaid & Lindsay, 2005). Curriculum, on the other hand, stands as a source of knowledge, skills, attitudes, values, and beliefs (Mulenga, 2018). This

means that the ICT curriculum is supposed to instill the required abilities in ICT graduates to get employment. To interpret the role of curriculum in enhanced employability of ICT graduates, the researcher would like to borrow the idea from Hillage and Pollard (1998), who define employability as the capacity of an employee to sustain self-sufficiently within the area of employment. Based on their capabilities, employees get access to the jobs available in the market and demonstrate their capabilities to their employers while performing their work. The curriculum is designed to equip individuals with such knowledge, skills, and attitudes to help them to make themselves fit for the job market. Therefore, embedding employability in the curricular process and integrating it into higher education is essential for the competency development of ICT graduates (Aamodt & Havnes, 2008). In this context, the researcher attempted to inquire about the reason for the employment gap in the ICT sector concerning its curriculum. While doing so, she conducted interviews with the ICT graduates, employers, and teachers selected for this study. Their perspectives on the ICT curriculum and its influence on employability are discussed.

In the process of exploring curricular processes and their influence on employability, the researcher interviewed an employer (Aarav) who explained the employees' knowledge and skills as follows:

> *I have been running this industry for about a decade. Almost every year, I announce vacancies for ICT experts. The newly recruited employees often get entangled in solving a problem and do not often meet the company's target within the given time. I then invite experts in the related field and conduct training programs for them, which becomes an extra employee cost for me. Even qualified graduates do not necessarily possess adequate knowledge and*

skills that are essential to meet the company's target. (Field note, 3 December 2021)

University graduates in the ICT field are supposed to be well-equipped with the knowledge, skills, and attitude that support them to fit the jobs they secure. However, their academic qualification does not seem to fully cater to their professional needs while performing their job. Here, O'Neill and Bagchi-sen (2022) claim that a university as such is an academic institution that produces the human capital required for a country's growth and development. The need for and importance of human capital is obvious in the field of goods and service industries in the country. That is, an able human resource contributes to the extension of knowledge in the related field of work, thereby promoting economic growth. In other words, universities produce human resources capable of producing goods and handling services adequately and efficiently in almost all sectors of development. When the researcher linked such function of the university with participant narrative mentioned above, she realized that the university in question is yet to strengthen itself, especially in producing ICT graduates in the country.

In this context, the researcher would like to raise a question: How does a university produce the human resources required for the growth and development of the country? To respond to this question, the researcher would like to draw inspiration from Valero and Reenen (2019), who assert that universities generally assess the country's needs and demands, especially in the production and service sectors, based on which they develop a curriculum to implement for producing the required human resources. If this is so, why are not university graduates, especially in the ICT sector, efficient in handling their jobs on their own, as claimed in the above-mentioned

narrative? Keeping this question in mind, the researcher interacted with an ICT educator (Bijay) at the university, who responded to me thus:

> *ICT pervades every walk of life. It demands a higher level of creativity on the part of the practitioners. It differs from one field of work to another. It must be service-specific or let's say problem-specific or need-specific. But the ICT curriculum in the university is still inadequate, as it is not designed based on the needs and demands of the markets. Actually, the ICT experts who design the ICT curriculum in Nepal often have ICT orientation from abroad and have mostly graduated from America and Europe. When they design the curriculum, they generally tend to incorporate contents that they learned during their stay abroad. As a result, the local level needs in the ICT sector are often disregarded in the curriculum* (Field note, 4 January 2022)

In a sense, the curriculum reflects the nation's development in general and its economic development in particular. If a university designs and employs an innovative curriculum, it often produces creative and innovative graduates capable of inventing new techniques, methods, tools, and systems to respond to the new challenges on the path to economic, social, and national advancement (Serdyukov, 2017). However, in this context, the researcher would like to raise the question: What kind of curriculum is innovative? When she linked this question with her participant's narrative, she found that curricula are said to be innovative if they empower the learners to innovate unique ideas to cope with new challenges in course of their social and professional lives.

Concerning her participant's narrative again, the researcher would like to be specific in explaining the innovativeness of the ICT curriculum. For example, graduates, during their university studies, may get an orientation to deal with one type

of social or professional needs and demands. When the same graduates enter the professional world, they may encounter new challenges they had never faced in the past. In such circumstances, they need to be creative/innovative in designing and implementing new tools, techniques, methods, and systems to adequately respond to the given problem. This also means that based on the general, universal and pervasive kind of ICT knowledge, skills, and attitudes, graduates should acquire a particular, local, and specific expertise through the curricular process. Such expertise, in the long run, helps them become experts in the field of ICT. To this end, when study participant expects the ICT graduates to be service-specific or problem-specific, he means that the ICT graduates are to localize their universal/curricular knowledge and skills. This is, for me, all about converting oneself from universal to local and general to specific in innovating new ideas, methods, systems, tools, and techniques to deal with new problems in the given time and context.

At this hour of her research writing, the researcher would like to raise another question: What prevents ICT graduates in Nepal from being innovative? To respond to this question, the researcher would like to go back to the narrative in which her study participant mentioned that the ICT curriculum often remains under the influence of general, universal, and international knowledge rather than reflecting the local, specific, and market-based needs and challenges. As in the narrative, such influence over the ICT curriculum is exercised by those who graduated from foreign universities. Nepalese graduates from foreign universities bring not only ICT knowledge and skills with them but also ICT contents and processes. Then they infuse the same knowledge, skills, contents and processes in the curricular processes of the universities in Nepal, equalizing the local needs and context with foreign ones and,

thereby, creating a gap between the needs and challenges in the national/local job market and the ability of the employees to handle them in the given time and context.

The inadequacy of the ICT curriculum was accepted by almost all the participants during interviews. For example, Sweta, one of the student participants, told the researcher:

> *After starting work in the seventh semester, I felt that the university taught us courses that are not needed in the professional field. It was a tough time for us to study all the subjects irrelevant to the work we do. I even went to the exam hall with tears, as subjects were too hard. It was an unnecessary burden imposed to us. We wasted our time focusing on irrelevant subjects just for exam purposes. In my view, courses have not been assessed and updated correctly.*
>
> (Field note, 14 December 2021)

She further said:

> *My teacher once told me that the courses offered in our university are either copied from some universities abroad or guided by someone who wants to introduce the course. In the process of graduation, I felt that no one is serious about its learning outcomes. For example, ICT- related education is more software oriented. Even the basic knowledge related to hardware, which is the base for robotics such as Raspberry Pi, Arduino, etc., have been largely self-taught, based on the interest and exploration of students themselves.*
>
> (Field note, 27 February 2022)

The curriculum deserves importance for an individual at three different levels, namely, personal, professional, and social. Connecting it with Muller (2012) provides me with the insight that a curriculum is designed aiming at the personal growth of the target learners. In this context, the question "How does curriculum contribute to

personal growth?" seems pertinent. Generally, a curriculum contains the knowledge, skills, and attitudes expected to be transferred to the target learners (Getie, 2020). Through such curricular knowledge, individuals interpret themselves and make their own meaning in their professional and social lives. As far as the profession is concerned, the curriculum helps learners to equip themselves with the essential knowledge and skills that help them perform their professional activities. Such knowledge and skills used in their professional life ensure an economic return. To put it differently, if the knowledge imparted through the curriculum does not strengthen their professional and economic knowledge, the learners no longer make meaning from the knowledge and skills they acquire. In such a context, the given framework of the curriculum reflects inadequacy.

Associating the opinion of study participant with the above-mentioned interpretation of curricular importance in one's professional life provides me the insight that the ICT curriculum designed for producing university graduates is rather insufficient and indeterminant. The ICT curriculum in the context of this research appears to be insufficient because, as claimed by study participant, it does not adequately address the professional needs of the newly employed university graduates; it is indeterminant because the curricular knowledge does not essentially help graduates decide what exactly they need to do to resolve the given problems in the specified time in their professional life.

In this context, this researcher would like to pose the question: Why is the ICT curriculum considered insufficient and indeterminant by fresh ICT graduates? This question encourages me to cite Brodsky and Newman (2011), who describe curriculum development as an intellectual, creative, and systematic process. In the process of curriculum development, stakeholders' participation, the assessment of the

contemporary needs of the professional world, availability of resources, development of contents, ways of disseminating knowledge, etc., are ensured in advance (Compagnucci & Spigarelli, 2020). If the ICT curriculum does not adequately and intensely pass through such a process, it often creates the image of inadequacy in the mind of its practitioners.

For a deeper analysis of the inadequacy of the ICT curriculum, another question might be pertinent: What prevents the ICT curriculum, as discussed above, from being part of the scientific process of curriculum development? The opinion of study participant is relevant here. When study participant feels that the ICT curriculum is a copy of the curriculum practiced in some other university in some corner of the world, unrelated to Nepal, it means that he does not get an adequate reflection of the context, contents, needs, and interests of the learners in the given ICT curriculum. This may be true in the sense that most often, the ICT experts in Nepal are graduates from foreign universities. When they return to Nepal and design the ICT curriculum for a particular university, they often hegemonize it with their personal values, interests, and expertise acquired in the foreign country. This also means that in the process of developing the ICT curriculum, in this sense, they largely undermine the learners' contexts, needs, interests, job availability, etc. The inadequacy of the ICT curriculum thus seems to be the product of expert hegemony.

The inadequacy of the curriculum was also reflected during interviews with the study participants, especially in terms of curriculum updates and implementation. Relatedly, Biraj, one of study participants, expressed his views thus:

> *Our ICT curriculum should be in tune with technological progress. But, in my experience, our curriculum designers do not have that luxury and have to*

design within a limited time frame, resources and constrained mindset. (Field note, 22 December 2021)

Similarly, Nimesh, a policy-maker, shared:

By the time you understand the new course, there is another course emergent in ICT. For example, the market is Artificial Intelligence (AI)-centric now, it might be centered on Quantum Computing later. There are challenges in removing obsolete courses and balancing existing curricula with new emerging content. Universities try to remove those courses but it is often challenging because of senior professors who have been teaching such courses for long. Many of them do not dare to teach new courses and update themselves. (Field note, 26 February 2021)

The inadequacy of the ICT curriculum was claimed to be one of the causes of the employability gap. This prompts the question: Why does an ICT curriculum appear to be inadequate? This question can be responded to variously with reference to the opinions expressed by study participants. As asserted by Tee et al. (2021), curriculum design is a technical, intellectual, procedural, and resource-consuming endeavor. It covers the objectives of the course contents, learning strategies, and evaluation procedures (Nghia, 2018). These demand technical expertise on the part of the curriculum designer. This is an intellectual attempt in the sense that it contributes to the development of an able human resource to support the nation in all aspects of development.

Inadequate Practicum

Practicum support students in translating theoretical knowledge into applications. With practice-based learning or hands-on experience, students can be self-learners. Practicum also provides an opportunity for students to connect with their

career goals and develop the skills required for professional advancement. The purpose of the practicum is to enable the students to work independently after completing the given academic level. Practicum eases the target learners into their profession, especially by equipping them with first-hand experiences and skills in the field of their knowledge. During the practicum, the students feel and realize how the theoretical knowledge they acquired in the university classroom functions in real-life situations. While interviewing student participant Sugam to explore the causes of the employability gap, the discussion focused on the frequency and quality of practicum for the ICT students in the university. He said:

> *We are studying ICT and we take notebooks to class and not laptops, and also copy notes from white boards after the teachers write on them. The theoretical course is completed for examination purposes only. Practical learning is not prioritized by the teachers as the theoretical* (Field note, 4 January 2021).

ICT is an application-based course in which a mere theoretical understanding of how devices work is not sufficient. This is the course that gives meaning to 'learning by doing' principles in classroom pedagogy. Learning by doing is a learner-centered approach in which the students learn by performing actions (Alkandari, 2020). In the context of ICT, learning means handling ICT devices and using them to get things done. That is, learning on the part of the learners matches the intensity of their engagement or participation in performing an action. While connecting the meaning of learning as such with the ICT, the researcher realized that the learners are left alone to work in an ICT situation. They are expected to have knowledge of ICT devices and skills in how to use those devices to achieve the desired result. They may also come across a *trial-and-error* technique of learning, in which they make multiple efforts and multiple mistakes, too until they learn things correctly. During the practicum, the

students are expected to be provided with opportunities to learn independently in line with the *learning by doing* and/or *trial and error*-based principles. The role of the instructor is to create a learning environment and make the learning devices available to the learners to ensure their intensive engagement in learning activities. Is the practicum in line with such principles of learning in the context of this research?

According to study participants, ICT classes are largely theoretical and less likely to be practical because the teachers emphasize more on providing the students with notes and narrations on how ICT devices work to bring about an expected result. On the other hand, the students' role is to write down the teachers' narrative on the given theme of ICT and reproduce the same in the exam. Such pedagogy is termed traditional, less effective, and non-innovative. This shows that the application of ICT devices is highly neglected in the process of teaching and learning ICT courses. Consequently, fresh university graduates cannot equip themselves with the essential knowledge and skills in the ICT field, creating an employability gap. In this context, the researcher enquired into the reason for such a deteriorating condition of practicum. Focusing on the practicum again, Sushant, another student-participant, said:

> *Our computer lab was established a long time back. Its condition is very poor. Some computers are functional and some are not. We students reported this to the campus chief, but there was no remedial action. When we talk about the necessity of computers, the Internet connection is often interrupted in our college. The issue is connected to the internet service provider. However, we found that our college did not pay the service fee and the service was disconnected. This was indeed extreme carelessness on the part of our college authorities.*

(Field note, 23 December 2021)

Practicum can be taken as part of pedagogy, and the quality of ICT pedagogy can be analyzed through its managerial, administrative, and pedagogic points of view. Pedagogies, in a sense, are various ways of visualizing and representing teaching-learning activities. However, pedagogy in itself cannot be separated from managerial activities. An effective pedagogy can take place in a well-managed classroom. That is, the quality of pedagogy reflects the quality of classroom management. This researcher realized that classroom management could be taken as a process in which students' behaviors are created and maintained in the given context of the classroom. Classroom management generally includes seating arrangements, accessories used to deliver the lessons, learning contents and materials, strategies to engage students, instructional design, etc. If such things are considered carefully, the quality of learning can be ensured on the part of the learners.

Is an ICT classroom managed appropriately to ensure the quality of learning on the part of ICT students in universities? To respond to this question, this researcher refers to the opinion of her study participant, who described the ICT classroom situation in his narrative. Concerning the data obtained from the study field, the researcher realized that the principles of classroom management are not reflected in the ICT classroom considered in this research. For example, when one of study participants said that the computers in the ICT lab are not up-to-date and that the internet system does not work well, he meant the ICT classroom is too poor to ensure quality delivery of lessons. When he revealed the indifference of the concerned authority, especially in improving the situation of the ICT classroom, he probably referred to the poor administrative and managerial setting for an effective ICT classroom. Relating such a situation of the ICT classroom with the learner-centered

learning principles and the *trial-and-error* principle of learning provides me the insight that the poor employability of the fresh ICT graduates is the product of unhelpful classroom management, i.e., poor instructional design, students' inaccessibility to quality ICT devices and the opportunity for their application. Explaining the inadequate practicum for ICT students Saugat, one of the students, told me:

> *All basics of ICT have been included in the syllabus. However, practical aspects of the concepts are not included in college. For example, though we learn a few programming languages, we learn only their theoretical aspects without practical learning nowhere on the scene. In this four-year-long course, we were assigned to carry out only a project. However, the project was also not clear, and now we are not confident about our knowledge of programming languages. We have to do additional courses from various institutions to understand the practical aspects of programming languages.* (Field note, 3 December 2021)

He further told me,

> *Another example I can mention is my experience of the internship interview. The Program Manager of the company asked me to swap the numbers without using a variable. I got confused and could not answer. When I asked him for the answer, I realized that we can add two numbers, the remaining number needs to be subtracted, and the residual number is the answer. This is simple. I could have thought it that way, but I didn't. This is not just my case but most of my friends have such problems. In the global scenario, the logic building related aspects are emphasized through practical exposure to work for long. However, we do not emphasize such logical thinking. That's what I feel.*

(Field note, 21 December 2021)

During the interview, some student participants did not hold the ICT syllabus responsible for the employability gap. For them, it contains sufficient content. However, they asserted that they did not have ample opportunities to practice the contents and knowledge of ICT, especially during their academic studies. In the name of practical activities, the students are provided with some kind of project work, which does not entirely reveal the practical significance in the field of ICT. In most cases, the project assigned to the students as a part of their ICT certification appears to them vague and irrelevant to contemporary market needs. As mentioned in the data, programing language in the ICT classroom is theoretically explained, but its practical significance is largely understated. As a result, the target students are able to learn only the knowledge aspect of ICT but do not acquire ICT skills to get things done in their professional and/or real-life situations. Giving the example of his deficiency in acquiring ICT skills, the student-participant mentioned that the employer examined him by assigning a particular task (to swap the number without using variables) which he could not perform successfully. He feels he could not solve that problem only because he did not have ample practice during their academic studies in ICT. This shows that ICT requires logical thinking, which in the long run can be developed through ample practice.

So far, this researcher has discussed students' perspectives of disassociation of practicum with ICT pedagogy in the context of this research. Now the researcher would like to discuss the perspectives of employers and teachers on the same. In this connection, Ankit, an employer, explained the reason behind the employability gap thus:

> *... I felt there is no match between what students study and what companies expect. Students don't have that much exposure in core technical aspects as well as additional skills like communication skills, report writing skills, and development skills. The reason is that there is no emphasis on practical learning. Innovation and creativity are not emphasized. For example, students are taught to make a calculator, which is basic learning, but just making a calculator does not ensure creativity. The calculator is already in existence; we expect our employees to focus on developing new products or support it*. (Field note, 19 January 2022)

The purpose of ICT education in a university is to produce ICT-skilled human resources. Such human resource is expected to have the knowledge, skills, and attitude to handle ICT-related issues in the job market and conduct independent research to explore new techniques and scope in the field of ICT. ICT is one of the most pervasive branches of knowledge that pervades almost all human endeavors, be it social, economic, educational, cultural, or other. In the sector of industries and infrastructure development, ICT is indispensable. Such sectors of business and development require innovative human resources to satisfy the needs of the company and the community. On the contrary, the employer of the company in this study asserted that ICT graduates' skills and the needs of the company do not coincide. For her study participant, the fresh university graduate lacks core technical exposure, which the company mostly needs. When the researcher considers the lack of technical exposure on the part of fresh university graduates (Suleman, 2018), she realized that exposure to any knowledge claim needs adequate practice in the related context. This gives the impression that fresh university graduates do not get exposure to core

technical utilities useful to the company where they are supposed to work after completing their ICT education.

In the present-day world, as mentioned by Menon (2016), education without innovation and creativity is not entertained, especially in the development and production sector. The contemporary job market needs innovative and efficient employees, and if they lack these qualities, they are considered professionally deficient. Such employability deficiency is revealed in the form of an employability gap in the context of this research. To the researcher, fresh university graduates in the context of this research follow the principles of knowledge reproduction in their professional life. They do not appear to be creative and innovative and hence face the employability gap. Focusing on inadequate practicum and the employability gap, Aarav, another employer confided:

> *When I was studying for my bachelor's, there business management and organization structure were two of the subjects. There was a teacher who had a remarkable corporate background. She used to tell us that she did not provide textbooks but would cover all the chapters through role-play. We used to call that classroom office. I remember that some friends were playing roles as a boss and some as messengers. I played the role of a messenger twice and learnt the perspectives of each role. In addition to that, she used to ask us to present our ideas. She used to take us for field visits and for the first time, I saw 2000 employees working together. I saw a computer server for the first time and realized that exposure is important. As she came from corporate culture and taught us that way, that changed my life*. (Field note, 11 January 2022)

Study participant reveals the method of practicum for ICT students. The practicum, for him, needs to connect the business world with the academic world. Engaging students in the world of work (practicum), in this context, means providing them with opportunities to use their ICT experiences and skills. Such opportunities appear to hold multiple significance. Through this, students can unfold their ICT knowledge and extend it to the maximum in the real work environment. They thus realize what it means to be an ICT graduate in the professional world.

Insufficient Work-based Learning

Work-based learning (WBL) is a proactive approach to bridging the gap between education and industry, where students learn what they cannot in the classroom. It may support students by developing employability skills so that they can function effectively in the work environment. Employability skills incorporate effective communication, interpersonal relationship, problem-solving, effective use of ICT devices, identification of the underlying problems, etc., in employing ICT to achieve the company's goal. Such skills are instilled in the ICT students, especially through engaging them in related work. WBL as such is ensured through internships, mentorships, and paid work in the ICT sector of Nepal.

An internship helps students to put their theoretical learning into practice at the foundational level and provides a competitive advantage in building competencies for career growth. During in-depth interviews with employers in this study, I realized that they consider internships essential in the ICT sector in Nepal. In this connection, one of the employers, Avash, said:

> *Internships are a requirement for most of the ICT courses in Nepal. This may be the reason why we get requests for internships from universities. The period of engagement varies from 3 months to a year. I think students need 6*

> *months with good company to be job-ready. Though they need to know what is out there, they are not required to get professional work."* (Field note, 19 January 2022)

The significance of an internship can be realized in four different ways. First, it provides students with opportunities to use classroom learning in the environment where they are supposed to work after they complete their academic education. The need for and importance of internship for students is highlighted by Inceoglu et al. (2018), who maintain that classroom learning contributes to developing the concept, being acquainted with theories, and equipping students with skills, while internship creates space for using those concepts, skills, and theories to bring change in personal and professional life.

Second, an internship also provides students exposure to the given branch of studies. In the case of ICT, the students realize during the internship how the ICT knowledge acquired in the classroom helps them refine and improve their understanding as they grow with the work in the professional environment (Nghia, 2018). The exposure as such may bring either an essential or unhelpful impression on the branch of knowledge. The unhelpful experiences during the internship are likely to demotivate the students from going ahead with the same, while the pleasant experiences induce them to explore more of the same and increase their scope of work far and wide. Every day in the internship may bring a new experience, heightening their interest in acquiring more.

Third, internship appears to be experiential learning on the part of the students. On the way to working in a professional setting, they learn how the profession in question is connected with the learning they acquired in the classroom. This is a student-centered learning approach in which the students become proactive on the

way to internalizing the underlying professional setting as a part of their academic journey. Forth, an internship creates the space for work experiences. Consequently, some colleges and/or universities make provision for 3 months, some others for 6 months, and still others for one-year internship for the students. The duration of the internship may depend upon the nature and the need of the course. When the target students do not get opportunities to get work experience during an internship, they are likely to miss the most essential professional qualities, thereby leading to an employability gap.

This researcher discussed the employer's perspective on work-based learning and how insufficient opportunities for work-based learning cause the employability gap. Further the researcher discusses the students' perspectives on work-based learning and its relationship with the employability gap. Explaining work-based learning, Sajjan, a student, said:

> *When I was in the seventh semester, I did an internship at one of the companies. I felt that what we study and what happens in the corporate world are different. I realized that college teaches us the core part of the subject but doesn't teach us to apply the concepts we learnt. My internship in the company provided me with ample opportunity to learn the area of my interest. I also knew what the priorities of the industry are and used the time to explore machine learning projects, core operations and projects that helped me to develop my overall thinking.* (Field note, 18 December 2021)

He further told me,

> *Internship teaches us how to manage time and what happens when we do not submit our assignment within the deadline. I experienced the importance of deadlines, and they taught us how to deal with complexity, time complexity,*

> *space complexity, optimization etc. I feel that an internship is a path to career growth. For me, the internship is very valuable because it builds my personality.* (Field note, 22 February 2022)

According to study participant, WBL contributes to developing the concept of how the knowledge industries and corporate houses are independent but interconnected entities. That is, the students in question, through work-based learning, realize how the knowledge acquired in the university helps in work performance in business and industries. This prompts the question: How can fresh ICT graduates in Nepal integrate their university with business and industries? When this researcher relates the data to this question, she learnt that the university focuses on subject-centered learning, while the industries focus on work-based learning. This may be the reason that study participants feel their learning at the university is different from the knowledge and skills acquired in business and industries. Since the subject-centered learning at university does not align with work-based learning in business and industries, it creates a gap for new ICT graduates, leading them to poor adjustment in their professional life.

In WBL, ICT graduates get opportunities for independent thinking, analysis, and reasoning concerning the related field of work. Since such thinking, analysis and reasoning take place in a given context, the students realize their meaning in their immediate professional context. Consequently, they not only learn how to work meaningfully in the given working environment but also build up or develop themselves as a professional being related to their areas of knowledge. Such opportunities contribute to enhancing their capabilities in social, professional, economic, and interpersonal aspects. Work experiences multiply their classroom knowledge, skills, and attitudes and induce them to delve deep into the given

knowledge. The continuous efforts in work and use of knowledge lead them to maturation, equipping them with the quality of being veterans in both knowledge and work fields. This may be the reason that participant remarks that they get the opportunity to explore machine learning projects and their core operation and develop overall thinking through WBL in the ICT field.

According to study participant, academic practices in the ICT classroom do not include some key professional ethics, guidelines, and qualities. For example, the value of a deadline, lived organizational culture, interpersonal relationships with co-workers and how life feels like in the presence of ICT within the organizational framework, etc., are some aspects of learning which cannot be acquired without being part of work in an organization during the academic session. Consequently, WBL in the academic environment of ICT deserves to be prioritized. In the context of this study, the students are largely prevented from being part of the work. They hardly get opportunities to place their classroom learning in the real working perspective of an organization. They thus pass the ICT graduation without being equipped with such qualities, which in the long run manifests as the employability gap. In some cases, internship experiences are not very good for students. In this regard, Saugat, an ICT student, said:

I nearly broke down during my internship. The reason is though I invested much time, it was highly unproductive to my career. Most of the time, I was advised to stay at the reception desk. I was not given any opportunities to learn my ICT areas. It was just a waste of time. (Field note, 3 January 2022)

In interviews with the participants, there were some cases where employers took interns for granted just to support their secretarial work. Some concerns about payment were also raised by some students. Saugat reported that he performed better

than even the employees of the company but was not even paid for his snacks and transportation. If students already have some skills that support the company, they can be paid, at least minimally, to encourage them.

WBL during the academic session in the field of ICT was claimed to be irrelevant. Some colleges, as explained by study participant, have provisions for deputing the students for an internship to acquire on-site experience. However, where they go for internships, students are not provided with the opportunities to acquire experiences related to the use of ICT. As claimed by this study participant, they are asked to engage in some irrelevant work, such as manning the reception desk, where they can hardly get any opportunity to use their ICT knowledge acquired in the classroom. Consequently, they cannot learn what they were sent to learn during the internship. Such misguided practices in the target organization create an employability gap in the field of ICT. Tee et al. (2018) aver that students in the internship program need to be well-observed and well-supported by both the college administration and the administrative staff of the target organization. This researcher realized that intense observation and support of students might be ensured through monitoring and supervision. Hence, both the source and the target organizations require making provisions for monitoring, guidance, and supervision of the students under internship. Such provisions would contribute to ensuring students acquire the expected experience.

During interview with the participants, this researcher realized that there are other issues with the internship. For example, some colleges have just a nominal internship. They are short and not taken seriously. Regarding this, the researcher inquired with Biraj, an academician. He said:

> *In my experience, an internship is considered a ritual task in several colleges. Unlike its objective of providing industrial exposure in a couple of months, some colleges design it for one or two weeks. I heard that some students were encouraged to submit internship certificates even if the college knew they did not undergo the internship. By this, learning to adapt to the industries by the graduate goes in vain.* (Field note, 27 February 2022)

Through this, the researcher realized that an internship is very important for graduates. It gives exposure to working to the graduating students because they get an opportunity to learn job skills. In the long run, it provides an ability to adapt to as well as perform better in the companies. However, there are issues with the internship. In some cases, students do not get the opportunity to learn, and they feel neglected. In other cases, some students are not encouraged to participate in the internship by colleges because it is taken as a ritual exercise.

Less Engagement in Extra-Curricular Activities (ECA)

Extra-curricular activities enhance individual learning in out-of-formal curriculum settings. Extra-curricular activities also support students in developing employability skills. Data analysis of this study shows that ECA helped much in developing their skills. ECAs are organized by both employers and colleges as well through initiatives of students. Employers mostly organize it to attract young talent to their companies. However, students in the process of participating in such events learn much for their career development. Such learning is essential to develop students' employability skills. Relatedly, Aakar, an employer, reported,

> *We organize boot camps, and assign students to pick projects of their interest. Within the event, students can complete projects, write blogs and also get opportunities to work with their mentors. The event is organized for three*

> *months. In 3 months, time, they learn so much that they become confident. Towards the end of the event, we organize presentation sessions. Such events are not only beneficial for students, but the events like boot camps and hackathon help us to find suitable employees. We know the interest of students in such events and can groom them for our related projects.* (Field note, 17 December 2021)

Ayon, one of the employer participants, also shared the importance of such events and activities, adding that there are a few events that are not enough. He said, *The ICT ecosystem can be developed together with fresh graduates and mould them properly. Therefore, we support students in their initiatives. In my experience, technically, I find bootcamps and hackathons very fruitful for learning and generating interest. Such activities provide opportunities to students to understand where they stand in terms of their learning. It also supports them in updating themselves. More such events that cater to each student enrolled are important to get the expected outcomes of human resources in the ICT sector.* (Field note, 5 December 2021)

Extra-curricular activities are a pertinent part of teaching-learning activities. According to Rust and Froud (2011), extra-curricular activities have multiple advantages for both students and colleges. First, they provide students with a shared learning environment in which they learn collaboratively. Such learning encourages students to work together in groups and learn individually, depending on their interests and ability in the given field of work (Pinto & Ramalheira, 2017). While working in a group, students get the opportunity to assess others and themselves in terms of their learning performance. In such learning, students realize that what they know and can do are the product of their connection, communication, and interaction related to learning content with others. Second, extra-curricular activities multiply the

interest and self-confidence of students. They connect their classroom learning with extra-curricular activities, which strengthen their classroom experiences. Consequently, they are able to enhance their self-confidence in the field of their knowledge and skills. Third, extracurricular activities also promote their socio-professional skills. In performing collaborative activities, they learn how they can maintain a WBL with colleagues: how to approach them concerning the given work, how they can perform and help others to perform the given tasks, and share the same among themselves in the specified working environment. Fourth, while engaging themselves in some kind of extra activities, students realize the meaning of their presence in a group, especially concerning the assigned job.

These varied skills help them grow both socially and professionally. These two different qualities on the part of the students help them adjust better in their professional life after obtaining their academic degrees. At this point in time, the researcher thinks that if a staff member in an organization does not connect himself/herself with others in terms of organizational performance and if she/he does not contribute to achieving the organizational goal, the staff member is not professional. Any would-be ICT graduate, in this sense, needs to equip themselves with these qualities before they enter the job market. In the context of this research, students do not get ample opportunities to plan and execute extra-curricular activities and are hence denied being equipped with such vital qualities that will confer success in their professional field. The fewer opportunities for students to engage themselves in ICT-related extra-curricular activities, therefore, appear to cause the employability gap.

In interviews with the academicians, this researcher realized that academic institutions too value such initiatives. Some of the colleges organize them on their own initiative and encourage students. Bijay, an academician, said:

> *Bootcamps and hackathons empower students by allowing them to work in teams. It enhances their skills in problem-solving and creativity. These activities are essential, apart from guest lectures, seminars, conferences and some exposures. My experience is that if we focus on extracurricular activities, students get more empowered. It even supports enhancing their technical capacities.* (Field note, 5 February 2022)

He further told me:

> *ECA matters a lot. It's a life for ICT students. Books and syllabi just build up our framework, but extracurricular activities help to achieve our goal. To me, boot camp and hackathon were useful for coding programs, which I am interested in. Boot camp taught me how to deliver the program on the computer and motivated me to participate in other extracurricular activities. By this, I realized that the boot camp gives us exposures to extracurricular activities and exposures help us face real-world scenarios. Therefore, we must take both education and extracurricular activities together.* (Field note, 26 February 2022)

A pertinent question here is: What constitutes extra activities in the context of ICT education and why is it emphasized by the ICT students? Connecting this question with the data mentioned above, the researcher recalls the statement of study participant that 'Boot camps', 'hackathons', and similar activities comprise the extra activities.

These activities supported study participants in equipping themselves with the skills of teamwork. Teamwork has multiple advantages (Nghia, 2018). First, working in a team provides students with opportunities to challenge, accept, agree, and disagree with one another's ideas, and eventually, they develop a negotiated meaning to solve the given problem. Such a working environment thus makes them communicative, collaborative, and expressive in the process of solving a given problem. Second, teamwork also provides them opportunities to legitimize one another's ideas based on their performance. In teamwork, students analyzed and interpreted the reason for the given situation/event and connected themselves with similar others, thereby realizing what it means to be part of a team in solving a given set of problems (Rust & Froud, 2011). According to study participant, such skills may be generated not merely by attending ICT lectures, seminars, or conferences, but by engaging in extra-curricular activities related to ICT. It is therefore obvious that the opportunities for extra activities on the part of the ICT students, the lesser knowledge, skills, and attitude they acquire. They thus do not perform as expected by their employers during their professional life. This researcher find that this is the context that causes the employability gap.

Extra-curricular activities in the field of ICT include the ICT devices and techniques to handle and use them effectively. Extra activities, therefore, not only equip students with social skills (as discussed above) but also strengthen their technical skills. Such technical skills prepare them for their future profession. For example, activities such as boot camp and hackathon helped study participant to learn about coding and delivering the program on the computer. Once they learned it through extra-curricular activities, they felt them to be useful while being positioned in the profession in the future. Delving deeper into the participant's opinion, the

researcher realize that the ICT classroom contributes to developing concepts while the extra activities are useful in providing students exposure to real professional life. Revealing the importance of extra-curricular activities in ICT education, study participants viewed that reducing the chances of extra-curricular activities for ICT students means denying them the qualities likely to affect their profession in the future.

Weak University-Industry Relations

As far as the matter of the employability gap is concerned, the relationship between universities and the business industries is viewed as reciprocal. Universities produce human resources, and industries consume them. Similarly, the latter use technologies to produce goods and services while the former conducts research on the use of new technology and inventing something new and better performing than the existing items.

The Industry-University relationship is essential for several reasons. First, the knowledge produced in the university can be useful for industries. Second, with collaboration, students can get exposure to the industries in their future workplaces. Besides, a university-industry relationship is essential for the individual growth of graduates. Saugat, a participant, reported:

> *I was so careless in my first semester, and I got a deficient grade. I was about to drop out of my study. In the meantime, I got to know an employer through my college teachers. After some informal talk, he told me that I have the capability but have not utilized it properly. When I shared my problem with the employer, he counselled me that I can definitely accomplish what I want in my life. After that, I felt motivated. This incident was beneficial to me.* (Field note, 21 February 2022)

Universities produce potential human resources, which are consumed by industries. In this sense, the university appears to be a laboratory, and the industry provides the space for these human resources to examine themselves as to whether they are well-produced. Whether the graduates fulfill the employers' demand is determined based on the grades they are awarded by the university, which indicate their capability and proficiency in studies. For Suleman (2018), the field of study in universities and the field of work in the industry are closely related in the sense that the former provides academic strength and the latter economic strength. By being tagged with the grade (based on academic strength) in the university, graduates learn their strengths for involving in economic activities through industries. The university thus helps graduates learn the academic meaning of being graduates from that university, while industries provide them the opportunity to measure themselves in terms of economic suitability.

When this researcher connected this explanation of university-industry relations with the opinion of the study participant, she realized that the relationship as such promotes the self-confidence of the graduates in making meaning of their life in terms of academic and economic significance. When study participant speaks of having obtained a deficient grade, he probably demeans himself for his academic performance. Since the academic performance of graduates predicts the opportunities they earn for involving in economic activities through industry, the study participant considered himself unworthy of ensuring a good career. Thus, the employability gap is the product of the poor tie-up between the academic and economic strength of graduates.

This shows that an industry-university relationship is essential for motivating students. The other participants highlighted its importance for cooperation. For

example, one of the academicians (Binay) told that universities require to understand what is happening in the industry.

> *If industry chooses to isolate itself from academia, after a certain time, academia becomes obsolete. If academics don't fulfill industrial requirements, learning at the university becomes outdated. In our case, we frequently conduct dialogues with industries. We bring industry experts and conduct sessions to ascertain the scenario of the industry. In many cases, students only focus on studies at universities and are not aware of the industrial conditions. The relevance and linkage cannot be shown without support from industry experts.* (Field note, 4 March 2022)

The poor employability of students can also be viewed as the product of poor bridging between university and industry. In a sense, the agenda of employability is concerned with the agenda of university-industry communication, collaboration, coordination, and cooperation that essentially represent the needs and demands of each. This prompts the question: What does it mean for both industry and university to be communicative, collaborative, and cooperative with each other?

This question seems to be relevant since it encourages me to explore how both industry and the university feed each other and how they both contribute to making the meaning of each other's existence. University supports industries to explore the new dimensions of business, the ways to approach people's needs and demands and implement systems, tools, techniques, and technological devices, especially through academic research. Industries, on the other hand, can finance research and bestow meaning to the research findings in the industrial context. Since both the university and the industry work for social advancement through people's empowerment by unfolding their academic and economic potentials in the given social setting, their

relationship is unavoidable. This may be the reason that study participant says that the university and the industry cannot realize their existence in isolation. That is, without an industrial focus, the learning in the university may appear outdated, and without an academic focus, the use of industrial systems, techniques, technologies, and resources becomes meaningless. Since industries are less focused on the academic environment in the university and academic intervention is less realized in the industrial environment, the employability gap becomes severe.

This indicates the importance of university-industry collaboration, progressing to cooperation. The dialogue between them can be mutually beneficial. Academia can update itself about industrial development from industry professionals. This is considered important by professionals working in industries. Aayush, an employer, shared:

> *It is necessary that professionals working in the academia visit industries and excerpt successful case studies. By this, students can learn and such published cases can be learning resources for the other universities and companies as well.* (Field note, 18 Febraury 2022)

On the ways to be collaborative and communicative, universities appear to be the dynamic side of the industries, while the latter appears to be a pragmatic side of the former. That is, the university generates ideas, which industries consume. However, the university does not generate ideas in isolation; it does so in the industrial context. Industries, on the other hand, do not merely consume ideas but imbue those ideas with their economic and social meaning. As a result, industries appear to be dynamic, and the university appears to have fulfilled its social and economic responsibilities through research, curricular and pedagogical activities. Such a university-industry relationship is revealed by study participant when he

claims that the academia visit industries and studies their functions and existence with academic perspectives, and the latter relate them with their social and economic significance. Such studies become the learning resources for university graduates and the industries themselves. Based on such learning resources, the university orients and trains its graduates to help them fit industry's requirements in their future careers. Since the university lags in doing so, especially in the context of this research, university graduates are likely to be the victims of the employability gap.

From Aayush's explanation, the researcher realized that the possibilities of connecting industries and universities were not made. However, an academician told me that he visits industries once a year and discusses the issues and problems faced by industries. The academician Biraj further reported,

> *I remember the day I visited an IT company. During that visit, the owner told me that he had been working for Hollywood animated movies. I was amazed with the work they have been doing. It was really impressive. Later, I invited him as a guest speaker and by this, students got a learning opportunity.* (Field note, 22 December 2021)

On many occasions, industries do not seem to be the reflection of universities. Industry, for study participant, is an autonomous organization that learns from several ideas being implemented in other similar industries worldwide. Although some industrial practices do not become part of the academic world, they meaningfully exist in the industrial world. In this context, it is the responsibility of the industry to incorporate such unique practices in universities' academic discourse so that they can feed their students with new industrial ideas in the academic environment. When study participant visited an IT industry and learned that the industry was working on Hollywood animated movies, he found it a new idea that he communicated to his

students. This shows that industries inform the university about new technological practices, which the university makes part of its academic practices. But in the context of this research, such industrial practices are not incorporated into the curricular activities in universities. Consequently, students remain uninformed about what is happening in the job market. Hence, after joining the industry for work, they do not appear to be a prominent employee for employers, thus revealing the employability gap.

This made the researcher realize that in some cases, academia-industry collaboration is in practice, and the collaboration supports the learning of the students. Understanding the importance of such collaboration, the researcher asked graduating students about their expectations therefrom. Smriti shared that she could link her e-governance course to practices when she got an opportunity to participate in a 3-day workshop organized by one of the employers. Similarly, Sushant reported: *"Our college invited a guest from one of the software companies as an evaluator in a project competition in the fourth semester. Later, three of us got an opportunity for internship in the same company".* (Field note, 23 December 2021)

One way to establish a cordial relationship between the university and industry is to organize extra-curricular activities in the university and invite employers to evaluate them. On such occasions, the university informs the employers about what they are performing as part of academic activities and how the students in the university would be useful to industries. The students, on the other hand, realize the industrial significance of their project works. This is the point where the relationship between the employers and the future employees (the students) emerges. Such events and engagement with them in the journey of graduation provide the students with an opportunity to realize how employers expect their employees to be. The employers,

on the other hand, learn how their would-be employees are taught and trained for their future career endeavor. This also opens up the opportunity for students to choose the industries for their internship program.

From the interviews with participants, this researcher understood the importance of collaboration between academia and industries. A few initiatives from both academia and industries support students in developing their capacity. Both academicians and employers agree on the importance of such collaborations. However, in many cases, the collaboration did not materialize or lacked effective implementation. To comprehend the reasons behind such weak linkages, the researcher asked employers and academicians about the challenges in such collaborations. One of the employers Aakar shared,

> *My team visited some colleges 3 years back and proposed a partnership for grooming their students from the first semester. Most of the colleges didn't agree. Some were initially interested. Later, we realized that they used it as a part of their marketing strategy and claimed collaboration with the industry in their brochure but when they filled up the required number of students in the first week, they stopped communicating with us.* (Field note, 17 December 2021)

University-industry collaboration has visible significance. It develops the ground for a closer working relationship. It provides the academia and the industrial staff with new ways of performing their roles and responsibilities. They both enhance their professional merits. It happens so when the industrialists participate in the academic activities led by the university and the academia in the universities participate in the industrial activities. While doing so, they both capacitate each other by sharing their information, creations, practices, and performances. However, in the

context of this research, the educational institutions did not appear to collaborate functionally with the industries, which created a gap between them. When newly appointed students hear about their college affiliation with a particular industry, they rate their colleges with a higher quality. As a result, some colleges in the area of this research tended to incorporate the name of some industries in their brochures as a part of their collaboration, but they are not likely to give the meaning of their collaboration on a functional ground. This may be the reason for the industry and the university to stay apart, creating an employability gap.

From interaction with Aakar, this researcher came to realize that some colleges are proactive and they come for collaborations but many of them are still with traditional mindsets. Such a mindset has been one of the major challenges for the collaboration between academic institutions and companies for the benefit of graduating students. With the data from the participants of the study, the researcher realized that strengthening university-industry relations is an essential aspect of the ICT sector to develop employability skills among graduates. There are a few initiatives, but replicability and scalability have been a challenge.

Limited Engagement of Students in Building Employability Skills

Students' personal engagement reduces the employability gap because they can enhance their skills when they personally engage in learning skills. This researcher came across a few cases and conditions in which the students' personal traits and the environment in which they grew up and were educated were asserted to be the causes of the employability gap. To put it differently, the students' personal traits, learning environment, and past experiences inspire them to engage in some kind of activities. The deeper their engagement in work, the more employable skills they acquire.

Employability can be consolidated when students are engaged in the activities of the universities. It is obvious that some activities of universities are connected to industry and, thus, with a meaningful engagement of the students in learning, they can be engaged with the future workplace. However, the data analysis of this study shows that students, in many cases, are not meaningfully engaged in building their employability skills which they can apply in their future workplace. The following section discusses the reasons for students not engaging meaningfully in universities.

One of the reasons why students do not engage in the activities of ICT colleges is that the subject is not in their area of interest. In some cases, their parents influence them to study ICT because they can find a job easily. In this connection, one of the employers (Avash) said that there is still pressure from parents even in the choice of career. Students can be proactive if they get an opportunity to learn what they want. Avash further told me that he studied humanities and social science in the beginning, in which he was not interested. Later, he started software studies, which were his real passion. He added that as he was interested, he worked day and night to succeed.

Parents pressurize students not only to choose the discipline of their study but to obtain grades. Consequently, students focus on securing marks rather than engaging in innovation and creativity. One of the academicians (Biraj) shared, *"Our parents and the society appreciate good grades. The way children are focused on exams and mugging up the concepts than to understand it is another major issue"* (Field note, 9 January 2022).

Learners' pedagogy in the context of Nepal in general, focuses on the grade students score in examinations. Exam-oriented pedagogy has been established as a trend in Nepal. Since children with better grades or marks in their exams are

appreciated by their families and community, the entire focus of the students is on how to secure better grades. Consequently, the employability skills on the part of the students are undermined. The academic exam in the university often assesses the students' understanding of the contents included in a particular course. Students, on the other hand, limit themselves to rote-learning and/or collecting information related to the course contents, to reproduce in the examination. Consequently, they often do not focus on engaging themselves in work that would promote their employment skills and hence lack the ability to secure employment even after passing their university degree.

For some participants, unawareness on the part of parents, especially concerning the employability of their children, prevents students from engaging with work related to their education. Parents were also blamed for not funding their children's education. Perhaps due to cultural influence, they spend much on their children, not on their employability. One of the academicians, Bijay, said:

> *Our parents are ready to buy expensive motorbikes for their kids but not ready to pay a small amount of money for additional trainings. Parents are ready to spend millions on sending kids to Australia or America but are reluctant to spend money on their growth and development. Parents often discourage youth from seeing their careers within the country. There is social pressure to pursue study in ICT. With few exceptions, the mindset of youth is structured by society in such a manner that he/she has to establish themselves abroad.*
>
> (Field note, 4 January 2022)

The parents of some students claimed to be focused on fashion rather than function. The local community understanding in the context of this research measures a human being based on the degree of fashion he/she sports. For example, those who

use many resources in life are supposed to be well-fed and well-cultured. Such parents intend to occupy a better position in society. Consequently, they focus on fashion rather than function. Function in this context means the quality of the individual that provides them with the opportunity to generate new ideas or engage in innovative work. According to study participant, parents are prepared to invest millions in sending their children to the USA or Europe but do not encourage their children to be functional in their home country. As a result, the students are not often engaged in acquiring skills that would help them get employment in the country. For some study participants, despite investing much in children's education, training, or employment skills, parents are often not sure that their children would get better job opportunities in the country. Consequently, they send their wards abroad for work rather than inspiring them to strengthen their employability. This may also appear to be a cause of the employability gap in Nepal.

After talking with employers, this researcher also asked a graduating student what demotivated them to explore a career in Nepal. Participants, Samragyi and Sushant, gave the reason that ICT graduates are not meant to stay in the country. The work they do here is just for transitioning and gaining some experience, to prepare a letter of experience for their enrollment at the Master's level abroad. This reflects the mindset of graduating students. If they prepare themselves for the overall development of their career in the ICT sector and excel, the outcome may be different; but if the focus of students is just to go abroad, they are limiting the overall development of their skills and competencies in the ICT sector. Even if they gain admission to national universities, they focus not on their studies but on going overseas. Such a transitional mindset among students is conducive to the consolidation of employability in their learning process.

It is not only that students are in a transition mode; they also feel insecure in the country, caused by their feeling that Nepal is not a good place for career advancement. There are no big industries where they can work and Nepal is always politically fragile. Consequently, they are not motivated in their study. Similar ideas were highlighted by many graduating students. Sushant shared, "There *are no big IT companies in Nepal where students like me dream to work*." This researcher posed this perspective to Aakar, an employer who is successful in the industry. He shared, *"there are very few companies which are creating a big impact in the ICT industry in Nepal. In fact, the situation sometimes is very frustrating, as the political situation of the country is fragile and thus, we ourselves get scared on reinvestment."* (Field note, 17 December 2021)

Why do students not engage much in acquiring a deeper level of employment skills in Nepal? This question may be due to various reasons. However, the country's socio-political environment seems to be one of the prominent causes. First, the students lack faith that their hard work in equipping themselves with employable skills in Nepal would yield any significant return. For study participant, big international companies are not established in Nepal; hence, they would hardly get an opportunity in the country to exploit their employment skills. Some students are hence indifferent towards investing time and resources in acquiring employment skills. Why are big multinational companies not established in Nepal?

In reply to this, Nirakar said that the current political conditions in the country were responsible for the absence of big multinational companies. According to him, the business environment is not friendly to employers due to frequent political upheavals in Nepal. Consequently, no company is prepared to make a huge

investment. Such conditions do not provide the students with a ray of hope to stay and work in Nepal. As a result, they are not likely to acquire employment skills.

The aspirations of graduates to see bigger industries in the country and the frustrations of employers with the current situation of industrial growth clearly show that the problem exists among all stakeholders. To understand the big IT companies, the researcher asked Ayush, an employer, who said,

> *It can be hard to invest in the ICT sector because the level of the anticipated level of growth has not been achieved in our country. We have missed prospects that could have been garnered from the ICT sector. In fact, in a country like Nepal, particularly in the ICT sector, we cannot compete with China and India. We cannot scale up to that level because we cannot find the level of human resources required for the world. If we are looking for overall growth in the ICT sector, supporting mechanisms are key. Although there are no explicit policies, educated human resource development on ICT can be pertinent for the growth of the sector*. (Field note, 23 December 2021)

With the concerns of human resource development, the motivation of the employers in Nepal came to mind, and the researcher raised this concern with them. Their view is that there is a growing trend of students returning to Nepal after studying abroad. However, some do not relish Nepal's situation, particularly concerning emoluments. In this connection, Ayon, one of the returnee ICT entrepreneurs, said: *"If youth gets good pay to sustain and enjoy moderate life in Nepal, their choice may change. I have seen many graduates who are enjoying here when they get a reasonable pay."* (Field note, 18 February 2021)

This also reflects the need for the development of the ICT sector to create higher-level opportunities with high-income levels, to inspire youth to work in Nepal.

The motivation of the youth is directly influenced by the security of their livelihood and the prospects they see within the country. However, studying overseas is beyond the capacity of many aspiring youths who want to build a career in the ICT sector. Some students even find the program in Nepal very expensive. They pay the college fees with difficulty. It is hard for them to spend on developing additional skills to enter and find sustainable employment in the ICT sector. They wish to learn and invest in themselves to enhance their skills and competencies, but unfortunately, they cannot afford it. Sweta, a student, shared this:

> *I came to this city to learn. I don't have enough money. At this age, it is so difficult to ask for money from my parents because I have seen them struggle to pay our expensive fees and other expenses. They already have a lot of financial burden. I know that if there is some external training and support, it will help my career. I feel a paid internship may be helpful.* (Field note, 24 February 2022)

The situation of students like Sweta hampers their career journey; however, this may be true of all graduates. Some get scholarships. For example, Ankit, an employer, said

> *We provide most of the training free for fresh graduates. Sometimes, we, too, become frustrated as we feel we are just preparing graduates for them to go abroad. We would be happy if they went directly to jobs in Nepal, but it is not the case. They go abroad for a better life, which is good, but this creates a dilemma for us whether to invest in training or not.* (Field note, 14 March 2022)

This shows that there are a few opportunities open to deserving students. However, information regarding such opportunities does not reach those in need.

Students are seeking opportunities, and employers and academic institutions are trying to provide in such opportunities in some cases, but the majority lack even information. In addition, there are some specific issues regarding the involvement of students in building their skills and competencies. Particularly for female students, there are many challenges.

Smriti, one of the graduating female students, shared that being a woman, it has been difficult for her to be proactive, and thus, she misses many opportunities. She feels females are dominated over in ICT- *If I start talking with seniors for my learning, they start to flirt instead*. Samragyi, another graduating student, shared this:

> *It was hard for me to choose an ICT program. I was advised to join nursing. My father supported me, but my relatives were against my choice of ICT as a career. Females are still considered not competent in the ICT sector. In addition to that, the learning process after college is challenging for females. Male students can stay outside, be in a group and work whole night on a project, but for us, it is next to impossible. We have to learn as well as behave "as female" even though the expected outputs from both males and females are the same.* (Field note, 19 December 2021 and Field note, 27 January 2022)

For greater understanding, this researcher inquired with one of the employers, Alpa, about the challenges and opportunities women face in the ICT sector. She agreed that there are challenges at the entry level. Competencies are doubted, and skills are suspected. However, she said that being women, there are opportunities as well. She added her own experience

> *I was one of the 3 female students in my class. I was an average student but I got a chance to participate in most of the opportunities that came into the college. With those exposures and prospects, I was able to build my skills. I*

> *became more confident than my male friends. I got into a job immediately after my study as the position was encouraged for women. I was the only female candidate in the job interview. In addition to my skills and competencies, I was privileged as a woman.* (Field note, 24 January 2022)

Alpa may represent one of the few cases, but according to other two participants Samragyi and Smriti, there are problems right from the stage of entry into education to the career of women in ICT. Relatedly, academician Bijay said,

> *There are still fewer female students from the entry level. We also do our best for encouraging women for enrollments. The scenario will be better if we encourage them from the primary level. I have witnessed a few initiatives and encouragement events for the promotion and support of women in the ICT sector. However, efforts are not enough. We need to do more. Some additional incentives may support female students to enroll more in ICT so that it is reflected in the ICT industry later.* (Field note, 23 December 2021)

From this, the researcher realized that females have specific problems by which they cannot engage much in learning compared to their male counterparts. Consequently, they feel difficulty in developing employability skills.

Chapter Conclusion

This chapter has primarily dealt with the reasons for the existing gap in the employability of graduating students. It discusses the perspectives of graduating students, employers, academicians, and policy-makers on how and why improper curriculum design, update, and delivery have become hindrances to developing appropriate employability skills among graduating students. It further analyzed the importance of practicum, work-based learning, and extra-curricular activities to graduating students. The result equally shows that the employability of graduating

students is not consolidated to reflect in the workplace. In this context, the linkage between university and industry is important. However, such a linkage has not materialized much to contribute to the student's employability. Importantly, graduating students' personal engagement supports the enhancement of employability skills for their career journey. The next chapter is focused on the findings and discussion of the results presented in chapters IV and V.

CHAPTER VI

FINDINGS AND DISCUSSIONS

This chapter begins with the findings related to employability in the ICT sector in Nepal, in response to the three research questions. The essence drawn from the findings is further discussed with relevant literature, themes, and personal reflections. Factors associated with employability in the ICT sector in Nepal are also discussed. The employers' expectations versus graduating students' preparation and existing gaps are highlighted thereafter. Then the reasons behind the existing gaps and the support mechanism are examined. The chapter concludes by proposing a model for the development of employability in the ICT sector in Nepal.

Major Findings of the Study

The study had two phases: quantitative and qualitative. The first phase identified three factors: core skills, personality attributes, and organizational adaptability as employability skills in the ICT sector in Nepal. Among these, the core skills consisted of technical capabilities, digital transformation awareness, learning aptitude, acumen, software skills, time management, basic hardware skills, analytical skills, and internship experience. The personality attributes were calmness, ethics, empathy, confidence, stress management, accountability, self-discipline, and being passionate. Likewise, organizational skills have the elements of adaptability, documentation skills, communication skills, project management, collaboration, teamwork, presentation skills, and excellent verbal English.

To confirm whether differences existed among the factors identified by employers and students, factor analysis was run separately for the graduating students and employers. The result showed that employability attributes such as problem-

solving, innovation, creativity, acumen, ownership, workplace learning, communication skills, technical capabilities, software skills, excellent writing skills, and project management were valued much by employers, whereas prioritization skills were valued by students and some elements such as hard work, confidence, etc., were prioritized by both employers and graduating students.

The quantitative analysis of this study also showed that core skills, organizational adaptability skills, and personality attributes, as observed by employers, are different from that of graduating students. Employers locate the employability constructs at a higher level than graduating students. The result also showed that employers' expectation of graduates' employability is higher than that of the graduating students. The expectation of employers regarding the attributes of graduating students on core, personality attributes, and organizational adaptability skills are higher than those of graduating students. The study also shows that employability attributes in graduating students are not at the level of expectation of employers. In the view of employers, the development of students' core skills and personality attributes are just present but not yet consolidated. Organizational adaptability skills have just emerged and thus are not fully present. In the view of students, all these employability dimensions (core, personality, and organizational adaptability skills) have just emerged but are not present yet.

After the employability gap, as expected by employers, and attributed to graduating students, was explored, the second phase of the qualitative study was used to explain the gaps. Particularly, the gaps have been explored in six areas. Among them, the first gap was improper curriculum design, update, and delivery. In the rapidly changing technological environment, curriculum design, update, and delivery did not adequately address the needs of the current market. Facilitators were not able

to deliver with excellence. The second gap was inadequate practicum- ICT graduates do not get adequate opportunities for hands-on experience and exposure to work. The third gap was insufficient work-based learning. Specifically, students do not get adequate opportunities to invest their time and efforts in internships and work-based learning. The fourth gap was about students' lesser engagement in extra-curricular activities. There were limited opportunities for graduating students to participate in extra-curricular activities. The fifth gap was weak university-industry relations. Consequently, there were limited opportunities for graduating students to learn the industrial systems, with the engagement of industry representatives in the university being a mere formality. The sixth gap was the limited engagement of students in building employability skills because some students focused more on their scores than on knowledge. In addition, some students felt insecure about staying in the country. Likewise, the specific cultural situation was not conducive for female students to engage much in the development of employability skills.

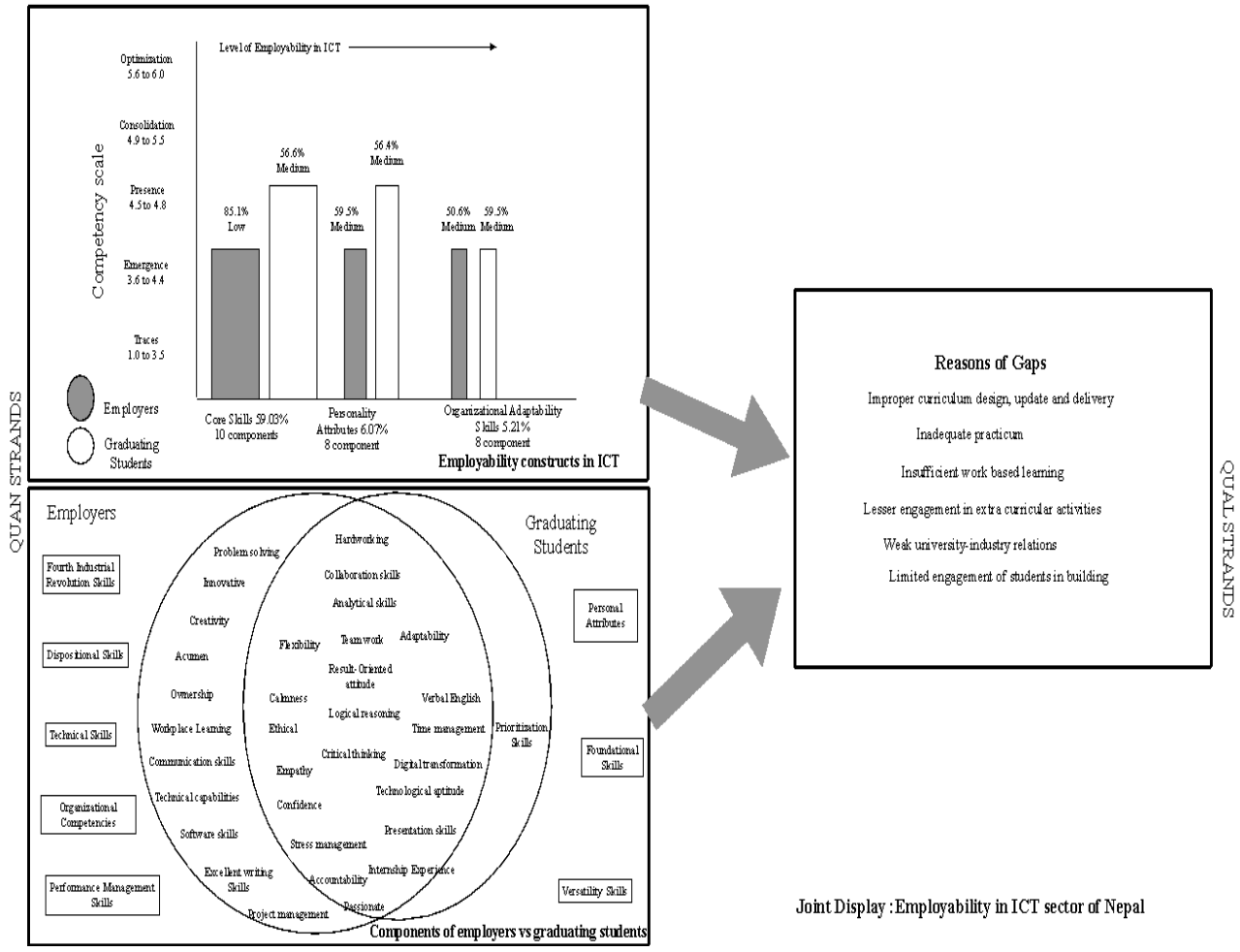
The findings from both quantitative and qualitative studies have been presented in the joint display (Fetter, 2018; Johnson et al., 2017) in Figure 5. In the figure, the employability construct, its explained variance, and the level of employability as viewed by employers and graduating students are presented on the upper left side. The factors of employability of ICT, core skills, personality attributes, and organizational adaptability skills were important for both employers and graduating students. Of these, core skills explained the total variance of 59.03 %, which showed that these are very important aspects in the context of Nepal. Importantly, the level of each employability construct had just emerged and was present or yet to be consolidated among graduating students.

The priorities of employers and graduating students are presented on the lower left side of the figure. On the same side, the common components and priorities of employers and graduating students are presented. This result revealed that employers accorded importance to five factors, viz., fourth industrial revolution skills, dispositional skills, technical skills, organizational competencies, and project management skills. However, personal attributes, functional skills, and versatility skills were prioritized by graduating students. When the priorities of both employers and graduating students were analyzed at the item level, there were common skills valued by both employers and graduating students. However, there were specific components valued by employers–problem-solving, innovativeness, creativity, acumen, ownership, workplace learning, communication skills, technical capabilities, software skills, excellent writing skills, and project management. The component valued by graduating students was prioritization skills.

The right side of the joint display presents the reasons behind the gap explored through the case study involving employers, graduating students, academicians, and policymakers. The reasons were improper curriculum design, update and delivery, inadequate practicum, insufficient work-based learning, lesser engagement in extra-curricular activities, weak university-industry relations, and limited engagement of graduating students.

Figure 5

Joint Display: Graduate Employability in ICT sector in Nepal



Discussions

Drawing from the quantitative and qualitative findings, this discussion section has been presented under four sub-headings. In each, relevant literature and theories are interwoven with the findings. In the end, a model has been proposed to depict the development of graduate employability in the ICT sector in Nepal.

Core, Personal and Organizational Adaptability Skills: The Factors of Employability

Employability skills are rapidly gaining interest, particularly in the ICT sector. In the dynamic digital labor platform, with the current pace of technological

development, meeting the required competencies of the labor market has become a challenge (Balabanova et al., 2021). In the meantime, the modern economy is dependent on the usage of technology more than ever globally. Even in Nepal, ICT is considered one of the emerging sectors for development (World Bank, 2019; IFC, 2019). In such a scenario, skills and competencies are considered major aspects of the development of the country. Many such skills and competencies are associated with graduate employability in the ICT sector. Among them, the quantitative results of this study showed a fairly clear split among the 26 items produced by the three-factor solutions of graduate employability in the ICT sector in Nepal: core skills, personality attributes, and organizational adaptability skills.

The factors associated with graduate employability in the ICT sector may vary in different contexts, including but not limited to geography and socioeconomic conditions. Fulgence (2016) grouped employability skills in the ICT sector into five categories: personal qualities, core skills, process skills, initiative & enterprise skills, and positive attitude. Among these, two skills–core skills and personal qualities–are similar to this study; however, process skills, initiative & enterprise skills, and positive attitude are not covered in this study. Similarly, a factorial analysis conducted on graduate employability in the ICT sector in India identified three factors, namely core employability skills, communication skills, and professional skills (Khurram & Bazan, 2021). The core skills identified in the India study are common to this study. While analyzing it in depth to the item level, the importance of technical skills is indicated in both the Indian study and this one.

In a similar study conducted among 982 graduates, Velasco (2012) stressed personal qualities and interpersonal skills as the key factors of employability. The second component identified by this study, personality attributes, is closer to the

personal qualities mentioned by Velasco (2012). Szilárd et al. (2018) listed the top ten skills of micro-level companies in ICT as skills of communication, problem-solving, teamwork, learning mindset, creativity, leadership, strategic thinking, customer service, innovation, and risk management. Among these top ten skills, the items associated with core skills and personality attributes are similar to the findings of this study. In a similar study conducted in Bangladesh, communication, critical thinking, and teamwork were identified as major employability skills in the ICT sector (Rahman et al., 2021). In a similar study of engineering education, Tymon (2013) identified communication, teamwork, information technology, planning and organizing, flexibility, adaptability, hard work, commitment, and dedication. Items such as communication, adaptability, and hard work were the underexplored factors of this study.

Although factors of employability skills are named differently in several contexts and geographical regions, basically, core skills, personality attributes, and organizational adaptability skills are common terms, and their importance and contribution to the ICT sector are often highlighted. Sampson and Fytros (2008) believed that acquiring such employability skills minimizes the gap between knowledge-oriented education and labor market need. In addition, building employability skills allows students to acquire new knowledge and establish themselves in their careers. Along with the importance of employability, core skills, personality attributes, and organizational adaptability skills are highlighted in the literature.

Core skills are important attributes and help to facilitate the work-education transition (Wimalasiri, 2015). This study has also largely recognized the importance of core skills in graduate employability in the ICT sector. Some studies were carried

out to explore core skills in depth. For example, Van Laar et al. (2017) conducted a systematic literature review to synthesize the relevant academic literature concerned with graduate employability in the ICT sector. Their review resulted in the formation of a comprehensive framework based on seven core skills: technical, information management, communication, collaboration, creativity, critical thinking, and problem-solving. Among these core skills, the technical skills of their study are similar to the technological capabilities explored by this study. Likewise, in another study by Klimas and Wojcik (2018), the authors reviewed both academic and grey literature from the scholarly as well as practitioners' perspectives and suggested that core skills consisted of communication skills, problem-solving, technological, team working, and management skills. Their study underlined the prominence of technical skills as important elements of core skills. Their finding is similar to this study. The result shows the importance of technological capabilities for employees in the ICT sector to cater to the needs of emerging technologies. In addition, technological capabilities are the keys to mitigating the existing gaps in graduate employability in the ICT sector (Suleman, 2018). Overall, with the tangible knowledge developed from technological capabilities, one can overcome the challenges of learning updated skills.

Technical skills, along with personality attributes, support graduating students' entry into the workforce. In the existing asymmetry between higher education institutions and industry, good technical grounding and the right personal skills support graduating students in developing their careers (Sahin & Celikkan, 2020). The personality attributes in this study are identified as one of the important factors associated with employability. Personal attributes are largely developed in the personal context of an individual, which is vital for personal upbringing because it provides an opportunity to consolidate employability attributes for the lifetime.

Employability attributes are built over time with a favorable socioeconomic and cultural environment. The process of transformation comprises physical, emotional, intellectual, spiritual, social, and economic states to reach self-empowerment and achieve full potential (Harvey, 2001; Tymon, 2013). These are various aspects in which personal attributes can develop well.

Both traditional beliefs and modern education have highlighted the importance of developing personal characteristics for a successful education, career, and life itself. One of the ancient scriptures, *The Bhagavad Gita*, explains that an individual's attributes can be improved through three disciplines: action, knowledge, and devotion (Prabhupada, 2006). However, these disciplines are developed when there is an environment conducive thereto. The *Atharva Veda* describes individual awareness as striving toward attaining *Siddhi* (*Vedas, Atharva Veda Samhita,* 1500 BCE/1962), and *The Arthashastra* explained them as traits that can be both innate and acquired (Kautilya, 150AD/1992). It means that the development of personal attributes emerges in individuals over time; however, a suitable environment is necessary. In the modern education system, personal qualities can be linked to one's engagement in activities, efforts, and persistence, leading to ultimate success (Eimer & Bohndick, 2021; Rothwell et al., 2008). The idea can also be related to the psychosocial perspective. We succeed in our endeavours when we believe in ourselves and put persistence into work. It is also a metacognition process toward identity development and building self-ability (Fugate et al., 2004; Mcllveen, 2018), where one finds oneself excelling and adapting more than others. This idea answers why some people are different from others in terms of career identity, even when they grow up in the same environment and socioeconomic situation.

Employees require not only better technical skills and personal attributes but also excellent skills in adapting to the changing environment (Wilson et al., 2015). On the one hand, technology is rapidly changing; on the other hand, the world is encountering unexpected situations such as COVID-19 and climate change. In such scenarios, adaptability is a major factor for sustainable employability. Organizational adaptability supports work transition and sustained existence in the workforce, fostering the capabilities of individuals. Succi and Canovi (2019) mentioned the importance of organizational adaptability. The ability to rapidly acquire new knowledge, apply the acquired knowledge to practical situations, and the ability to identify and resolve problems are indicated by their study. In this study as well, organizational adaptability encompasses adaptability, along with communication skills, which have been emphasized in many studies (e.g., William, 2018; Baird & Parayitan, 2019; Klimas & Wojcik, 2018; Fulgence, 2016; Tymon, 2013; Van Laar et al., 2017) as a key factor determining employability.

Through this discussion, the researcher realized that core, personality, and organizational adaptability skills are factors that are building blocks of employability skills in the ICT sector. Within each of these factors, there are certain elements that require our attention to bridge the employability gap. For example, technological and communication skills are regarded as important in the ICT sector.

Gap in Employers' Expectations and Graduating Students' Preparation

In this study, the majority of employers viewed the core skills of graduating students as low, whereas the students themselves viewed them as a medium. None of the employers considered the core skills of graduating students high. This implies a gap between the employers' expectations and graduating students' preparation. Additionally, while comparing with the competency scale, employability in the ICT

sector has just emerged in the view of graduating students. However, employers consider core and personality skills as just present and yet to emerge, but organizational adaptability skills have just emerged. This result reveals an existing gap that is expected to be bridged to synchronize employability in the views of employers and graduating students.

The graduates fail to meet the industry's expectations. Several studies confirm this. For example, the National Association of Colleges and Employers indicated that the desired skills are lacking in new hires. In the study, students rated that their skills were not as per the expectation of the employers. The study also revealed that the enforcement of extra-curricular activities and academic involvement was adopted to mitigate the gaps (Dupre & Williams, 2011). Similarly, a study conducted in the agriculture sector also disclosed the variation between the views of students and employers about what the industry expects by way of core employability skills (Sebastian, 2021). In other research carried out among accounting professionals, Klibi and Oussii (2013) found that employers seek a diverse range of non-technical skills from graduates. Likewise, in a study conducted on engineering education, a significant gap was observed between the employers' expectations and the skills possessed by graduates. In a study on business education too, the employment-readiness of graduates was found inadequate (Khurram & Bazan, 2021). All these studies reveal that the gap between employers' expectations and graduating students' readiness persists. The importance of addressing such gaps has become an agenda of concern for both employers and academic institutions. This researcher realized that reforms have been recommended in all these studies to address the gaps (Aprile & Knight, 2020). The most common reforms proposed related to updating the

curriculum (Acuna et al., 2016). In addition, the engagement of students in extra-curricular activities and work exposure (Dupre & Williams, 2011) was also suggested.

This study finds some differences among the views of graduating students and employers on employability components. Employers gave importance to items of problem-solving, innovativeness, creativity, acumen, ownership, workplace learning, communication skills, technical capabilities, software skills, excellent writing skills, and project management, while students valued prioritization skill. The skills of hard work, collaboration skills, analytical skills, flexibility, teamwork, adaptability, result-oriented attitude, calmness, ethics, empathy, confidence, stress management, accountability, being passionate, logical reasoning, critical thinking, verbal English, time management, digital transformation, technological aptitude, presentation skills, and internship experience were common for both employers and graduating students.

Such differences in views can be found in the literature. Sebastian (2021) found variation between what the students perceived as important skills and the requirement of the industry. The students perceived self-motivation and interpersonal relations as important skills, whereas the employers indicated problem-solving, analytical visioning, and creativity as essential. Likewise, a substantial difference of opinion between employers and students on employability skills was observed for entry-level positions (Chawdhury & Miah, 2019). In the study, problem-solving, internships, and critical thinking were emphasized by employers.

The employers of this study view that acumen, workplace learnings, communication skills, technical capabilities, software skills, and project management are the factors associated with ICT graduate employability in Nepal. These qualities are not much emphasized by the students of this study. This shows that there are some limitations in our education system due to which students lack awareness about the

importance of such skills. These qualities are accorded importance in literature. For example, acumen is important to support graduates in their decision-making (Utsav, 2018). It is also regarded as a prerequisite for acquiring other skills because it supports developing meta-competencies (Baharoom et al., 2013). Another element, "internship", is important for workplace learning. It is a key to the process of adaptation (Inceoglu et al., 2018). Likewise, verbal and written communication skills are regarded as important skills in several studies (Guardia et al., 2021; Baird & Paryitan, 2019). Ineffective communication skills prevent graduates from expressing their knowledge and ideas. Similarly, technical capabilities are much valued in the ICT sector (Sehgal, 2018) because they are fundamental skills and a foundation for ICT graduates. The other one called management skills equips graduates to take up a new job or to develop an enterprise. Therefore, project management skills work as a gate pass to the world of work (Smith & Worsfold, 2015). Considering all the prominence of developing such employability skills, it can be claimed that ICT students do not engage in developing these skills. In other words, our education system hardly works to realize the importance of such skills. The consequences may affect the career path of graduates because some job skills are not imparted to them.

The other skill, called problem-solving, has been identified as one of the important attributes in the employability discourse (Whelan, 2017; Tee et al., 2018). This is a skill in high demand in the ICT sector that high-tech innovators strive for and is thus considered important in a lifelong approach to learning, acquiring new skills, and adapting existing skills (Osmani et al., 2015). Rayner and Paperkonstantinou (2015) found that 98% of employers valued problem-solving as an important trait for the employability of graduates, which was echoed by Tee at. al. (2018), who found a discrepancy of about 64% between employers' expectations and

graduates' perceptions in the problem-solving attribute. Likewise, Osmani et al. (2015) found in their systematic review that problem-solving is a highly prioritized attribute in the discourse of graduate employability. It is an important skill required in the study-to-work transition (Dean, 2017). This implies that problem-solving is an important skill for graduating students but has not been developed as per the expectation of employers. Its importance is not recognized much by graduating students, which can hinder their graduate employability in the ICT sector in Nepal.

Creativity is another important attribute that ICT graduates require. The participant employers of this study highly value it because it supports the development of a range of solutions for developing skills and competencies (Jackson & Chapman, 2012; Osmani et al., 2015; Teng et al., 2019). The role of creativity in employability skills has been well recognized in the literature (Rudolph et al., 2017) and has thus become an agenda of employers. In contrast, in a study surveying 11000 employers and 16000 students, creativity was valued by students as well. This was a contrasting finding of this study.

While transitioning from higher education to the workforce, along with creativity, innovation is presented as an element of productivity in higher education (Menon, 2016). The importance of innovation and creativity is explained together because these are important job skills. For example, in a study, out of 53 items of employability skills, innovation, creativity, and ownership were found to be the key skills (Prinkshant et al., 2019). McGowan and Shipley (2020) acknowledged these skills for their contribution to the emergence of a knowledge society. These employability skills can be a catalyst for reconceptualization of ICT in the changing context. In the fourth industrial revolution, these employability skills may support to adapt adaptability in the future.

Some initiatives have been taken to fulfill the gap between employers' expectations and graduating students' preparation. Traditionally, training was prioritized to develop specific skills, and it was mostly short-term. Many ICT companies create a separate wing to build the capacity of employees related to their work (Rouline & Bangerter, 2013a). In addition, the education sector reforms curricula to build a partnership with industry. By this, training can be understood as a means to cater to the short-term needs of ICT enterprises. In the long run, the newly emerged ICT skills are integrated into the university curriculum (McGowand & Shipley, 2020). University education can do better in recognizing the needs of students and supporting them to apply their innovative knowledge in their future workplaces. Such initiatives mitigate the gaps between employers' expectations and graduating students' preparation.

The Six Gaps: Constraints to Attribute Employability

The reasons behind the gaps between employers' expectations and graduating students' perceptions were well explained by the participants of this study. This researcher related their narratives with some relevant literature to unfold how the employability gap emerges from the local contexts in the ICT sector. She got an insight that there were six major reasons behind the gap, as shared by participants through their views, ideas, and experiences in this study. They were curriculum design, update and delivery, inadequate practicum, insufficient work-based learning, less engagement in extra-curricular activities, weak university-industry relations, and limited engagement of students in building employability skills. Similar reasons have been explored in other studies. For example, Abbasi et al. (2018) found that limited exposure to academia and irrelevant curriculum to address the need of the industry are behind the gap in the employability skills of graduates. Nghia (2018) identified less

participation in extracurricular activities, inappropriate pedagogical practices, and fewer workplace leanings (Nghia, 2018) as explanations for the gap.

Curriculum design is a procedural phenomenon in the sense that it follows a process (Tee et al., 2018). In the process, needs are identified, learners' interests, abilities, location, and aspirations are explored, objectives are set, and contents are decided upon to be imparted to the students. Moreover, learning strategies are determined and the mode of evaluation is set to ensure that the learning outcomes meet the learning objectives. For all these endeavors, substantial time, resources, and expertise are needed. Lack of time and resources, intellect, and aspiration often makes the curriculum unable to address the learners' needs (Acuna et al., 2016). According to study participants, in the case of curriculum design, resources are not adequately invested, making the curriculum inadequate. The other reason for the inadequacy of the ICT curriculum is its inability to capture the rapid changes in the technological world. Study participant avers that the world is dynamic, made more so by technological advancement; but the ICT curriculum is unable to include such changes in its framework (Abbasi et al., 2018). In the context of research, the curriculum is developed by an expert who does not consider technological change while designing the curriculum. But, at the time of its implementation, some other advancement takes place. Thus, the curriculum always lags in catching up with the technology being implemented in the contemporary market (Rahnuma, 2020). Consequently, the students learn about one kind of technological setup in the classroom and when they enter the profession, they encounter a technological usage in the working place which is different from the one they were acquainted with in their ICT classroom.

The curriculum thus appears to be inadequate for the students (Acuna et al., 2016; Bridgestock et al., 2019). The other important point concerning curriculum

design is that generally, the ICT curriculum is designed by experts who have graduated from universities abroad. Similar exposure is not available to other course tutors; consequently, the available curriculum is not implemented with excellence throughout the country. Students, therefore, often lag in this regard. ICT graduates often appear to be inadequate and less able to handle ICT-related work in the contemporary job market.

Another important reason is an inadequate practicum. The significance of practicum may increase when it provides ICT graduates release of their work anxiety. For Alkandari (2020) and Pan et al. (2016), the students, during academic sessions, are filled with thrill and anxiety. They might feel pleasure thinking that they would acquire a new experience in the professional world after graduation. The practicum, in this context, provides them with opportunities to expose themselves to the work in which they are supposed to engage after graduation (Storen & Aamodt, 2010). Such exposure during their academic studies rids them of their anxiety and increases their self-confidence, making them fit for their profession. Such qualities may be the result of the opportunities to studies of role play, demonstration, and simulation in the industry, supplementing their ICT knowledge and skills (Menon, 2016). These techniques help them acquire first-hand experience in the related field. However, the ICT graduates in the context of this research do not get such opportunities adequately and hence remain in the gap of employability.

Another cause of the gap is inadequate EBL. The ICT curriculum provides for an internship to help students acquire WB L *en route* to their graduation (Nghia, 2018). Since the students do not get the opportunity to invest their time and efforts in the internship as expected in the curriculum, they often do not acquire ICT skills and are often unprepared (Inceoglu et al., 2018) to deal with ICT-related activities in their

profession after obtaining their academic degree. Such practices in the field of ICT education in the context of this research are likely to create an employability gap (Tee et al., 2018). The most hazardous situation, as explained by study participant, is that in some cases, the students are provided with the internship certificate even without undergoing an internship program. Although such practices are known to the colleges, they primarily do not respond to them duly. In this case, an employability gap appears inevitable among the students in question.

One more important cause for the existing gaps is the absence of extra-curricular activities in the ICT field. These activities not only help to equip them with social skills but also strengthen their technical skills (Rust & Froud, 2011). Such technical skills prepare the students for their future professions (Pinto & Ramalheira, 2017). For example, activities such as boot camp and hackathon helped study participant to learn about coding and delivering the program on the computer. Once they engage in extra-curricular activities, the knowledge acquired therefrom would be useful to them in their future profession (Nghia, 2018). Going deeper into the participant's opinion, the researcher realized that the ICT classroom contributes to developing the concept, while the extra activities, for them, are useful in getting exposure to real professional life. Revealing the importance of extra-curricular activities in ICT education, study participants viewed that reducing the chances of extra-curricular activities for ICT students would rob them of these qualities and are likely to affect their professional performance in the future.

One more important cause of the gap is a weak university-academia tie-up. Universities have the responsibility of producing capable human resources and are therefore supposed to take the lead in establishing, maintaining, and strengthening relationships with industry (Suleman, 2018). However, in the context of this research,

such a proposition does not come about automatically. While connecting the idea of study participant, the researcher realized that some industrialists and/or employers in the context of this study are proactive in giving meaning to the university-industry relationship. Industry, on the one hand, functions as per its aims and objectives in the market environment, and the same industry, on the other hand, trains new university graduates in line with its business activities and consumes them as human resources.

This also means that if an industrial or business organization begins to function as an organization for learning side by side, the employability gap can be reduced considerably (Ishengoma & Vaaland, 2016; Brooks & Kay, 2014). In this sense, the industry can work as a vehicle for increasing employability. An ICT company can also be a learning organization if it adopts a culture of collaborative learning (Suleman, 2018). In this regard, employers need to develop a collaborative system of working in which every employee is both independent and interdependent in the same system. One employee's efforts can be another's working strength, and, in this sense, in a collaborative working system, each helps the other by helping themselves. An ICT company can be a learning organization if it provides lifelong learning for its employees (Oranzbayeva et al., 2019; Evers et al., 1998). In performing their assigned jobs, the employees may face new challenges. Such challenges can be overcome when they are provided with an opportunity to learn continuously through the industrial system. The employees get the opportunity of learning, together with the opportunity of doing jobs. However, such practices are found to be minimal in the context of this research, which widens the employability gap.

One of the most important causes behind the existing gap in this study is an inadequate engagement of students in their personal development. Overall, from the

participants' views, it can be inferred that students in many cases are not much engaged in building their employability skills. Personal engagement of students is an important aspect of gaining employability skills (Yorke, 2006). There are many reasons for students not being engaged. First, some study ICT without interest and on pressure from their parents or close friends and relatives to enroll themselves in universities. Second, some students are interested in pursuing their higher education overseas and use the time to attempt admission to universities abroad. They do not engage in the study much in this transition period; however, their persistent action is necessary for their success (Knight & Yorke, 2004). Such students are focused solely on completing their studies. Consequently, their employability skills are not developed well. Third, students consider life in Nepal insecure due to the political situation and hence cannot engage much in their studies. Likewise, their feeling that Nepal cannot establish large-scale ICT companies also plays a role in perpetuating the gap. Lacking such trust and belief, students hardly develop their employability skills (Meehan & Howelles, 2019). Fourth, education is expensive for some students, particularly those who have come to study in cities from villages. They cannot attempt to gain employability skills with their resource constraints. Fifth, there are specific cultural situations for females which prevent them from engaging much in the development of their employability skills. Cultural aspects significantly affect the development of employability of youth (Tomlinson, 2017). Due to the aforesaid reasons, in many cases, employability skills are not fully developed among students.

Consolidating Sustainable Employability: A Proficiency Model

This researcher has discussed the causes of the employability gap concerning the findings of this study. The researcher related those findings with some relevant literature to unfold how the employability gap emerges from local contexts in the ICT

sector. In the process, the researcher highlighted the inadequacy of the curriculum and practical activities related to the ICT course in the classroom, insufficient work-based learning, less engagement in ECAs, weak university-industry relationships, and limited students' engagement in cultivating employability, all as contributory causes for the significant employability gap in the context of this research. However, the researcher would like to restate the causes of the employability gap through the lens of the social cognitive career theory, which would help me to reemphasize how these causes of the employability gap affect students' careers.

Concerning the social cognitive career theory (SCCT) (Lent et al., 2002), the researcher would like to perceive success in a career as the product of the personal capabilities of the fresh ICT graduates and the expected outcomes of their performances in jobs. Based on their success and failure, ICT graduates can decide to improve or reshape their personal capabilities, beliefs, career choices, values, and performances. In this context, a pertinent question arises: Why do ICT graduates in the context of this research appear to be inconsistent in their capabilities, beliefs, career choices, values, and performances? Going by their narratives, the researcher observed two different aspects concerning their career and education: one that affects their personal and/or internal mechanism of knowing or being capable of holding, maintaining, and strengthening the career, and the other that remains out of their control (O'Shea et al., 2021). The analysis and interpretation of the findings of this study reveal that the learning experiences of graduating students affect their self-efficacy, which can be altered based on the success and failure they encounter in their efforts for career development.

Such efforts and abilities may remain under their control, which they can handle or reaffirm based on the needs of their interest, choices, and career contexts.

However, some other causes of the employability gap, such as inadequacy of curriculum, practicum, work-based learning, and university-industry relations, remain beyond their control (Aprile & Knight, 2021). That is, these components that affect their better placement and choice of career are part of the university system, which cannot be reaffirmed or revised merely by the personal efforts of the students. Consequently, the students are bound to come across inconsistencies in their career interests, choices, placement, and performances.

After graduation, the students consider themselves capable of holding the jobs they were oriented towards during their academic sessions. However, when placed in a particular job, their employers do not find them appropriate for the same. This situation questioned students, inviting perplexities, controversies, and paradoxes in their professional lives, which are connected with their interests, choices, placements, and performances. This researcher would like to pose a question here: What challenges students' interests, choices, capabilities, and performances related to their career, and how do such challenges push them into the domain of the employability gap? This question can be dealt with through the lens of the SCCT, especially with reference to its interests, choice, and performance models.

Drawing on the SCCT, the researcher argues that the interest in a particular type of career can be raised depending on self-efficacy, performance attainment, and engagement in occupationally relevant activities. As per the findings of this study, inadequate curriculum, insufficient practicum, a weak relationship between university and industry, etc., do not allow students to meet the expected self-efficacy, performance attainment, and engagement in occupationally relevant activities (O'Shea et al., 2021). Consequently, they lag in re-strengthening their interests in being employed. Interest development for a particular career in the context of this

research, therefore, appears to be a fluid, inconsistent, partial phenomenon ridden with perplexity.

As asserted in the SCCT, career choice does not remain isolated from career interest. Intentions to pursue a particular career path emerge from self-efficacy, interests, training, expected outcomes, and performance attainment. Since ICT graduates in the context of this research hardly get support through the existing curriculum, ICT practicum, the approach of their engagement in work related to their academic studies, and ECAs related to ICT being supported by the university, they find themselves making inappropriate career choices. As a result, they appear to be the victim of perplexity, controversy, and paradoxes, in the process of affirming their career choices.

According to the performance model (Lent et al., 2002), on the path to success in a particular career, the researcher asserts the ability of the graduates gives meaning to their job performances. That is, their ability or inability confirms or weakens their job performance. Their ability, in turn, is reinforced through their self-efficacy. In this sense, self-efficacy, ability, and job performance are interrelated in ensuring success or failure in a career (Menon, 2016). Relating this theoretical standpoint to the context of research, the researcher has come across inconsistency, insufficiency, and inappropriate exposure, feedback, and engagement, while graduating from the university. Such conditions appear to be the product of inconsistency, insufficiency, and inappropriate curricular and extra-curricular contexts, activities, engagement, and opportunities for learning. Such conditions create employability gaps.

This researcher would also like to examine the employability gap through the lens of the Human Capital Theory (Becker, 1985). The purpose of using this theory in this context is to unfold the meaning of employment and its contribution to

the job market. With the help of this theory, the researcher would like to articulate how the causes of employability, as discussed in this chapter, emerge in the field of employment, education, capital formation, and economic growth. Since employability skills in the context of this research are measured in terms of education, the researcher would like to include the terms education, employability, human capital, and economic growth in the discussion. The Human Capital Theory measures human beings in economic terms (Becker, 1985). It depicts the human being not as an independent entity living in a social surrounding but as capital, based on which economic advancement is ensured (Mahoney & Kor, 2015). Human beings in the field of economy represent capital which is formed and strengthened through education. In this sense, equipping the students in universities with due knowledge, skills and attitudes mean investing in them to transform them into able workers. Thus, better education on the part of an individual would ensure better financial gain, which would ensure better living at the individual and national levels (Rothaermel, 2013). That is, education is an instrument through which a human being is turned into capital, which serves as the basis of economic growth.

In the context of this study, this prompts the question: Are students graduating in such a way as to turn themselves into capital? Do they really function as capital and contribute to economic advancement? To respond to these questions, another question can be raised: Are they provided with better opportunities to equip themselves with quality education depending on the level of their education? This question encourages me to consider the causes of the employability gap, which also gives me the impression that students hardly get a quality opportunity for education in their university classrooms. Thus, they neither fall into the category of a complete human because they lack the required education nor prove themselves as capital because they

cannot ensure economic and financial gain as expected, as they suffer from being unemployed. Time and resources are invested in educating and training the graduates, aiming at higher earnings. However, at the end of a particular academic program, the graduates are considered incapable of performing their roles and responsibilities after being employed. Therefore, the causes of the employability gap among graduates appear to be major obstacles to transforming them into capital.

Looking at this gap from policy perspectives, some policies and documents have guided work-based education at a higher level. The country's constitution, education act, and plans such as the school sector reform plan contain equitable provisions for quality education linkages to employment. The recent School Education Sector Plan 2021-2030 focused on employability skills through education (MOE, 2022). While the need for education sector linkages to the labor market is emphasized, this has not yet found expression in appropriate practices (Balmer et al., 2020). The gaps presented in this study reflect the importance of addressing the issue of graduate employability in the ICT sector. Thus, it is clear that the mismatch between demand and supply is due to the absence of proper need assessments, traditional supply-driven courses, and a conventional delivery approach. Fewer opportunities for practical exposure and inadequate career guidance and counseling system are other causes of consequence (National Institute for Research and Training [NIRT], 2016; Bhattarai, 2009).

Initiatives and boosting the existing initiations in this regard can support the process. In some cases, the platform for the graduating students plays a role. The platforms are necessary because inadequate platforms limit the opportunities for raising the employability of graduates. Some initiatives have been taken at the levels of the individual, academic institutions, and industry. These initiations represent silver

linings in developing the proficiencies of ICT graduates. The initiatives are largely connected to the factors associated with the employability of graduates and by their promotion, existing gaps in employability can be mitigated to some extent. A model has been proposed on the basis explained above, integrating the results of this study.

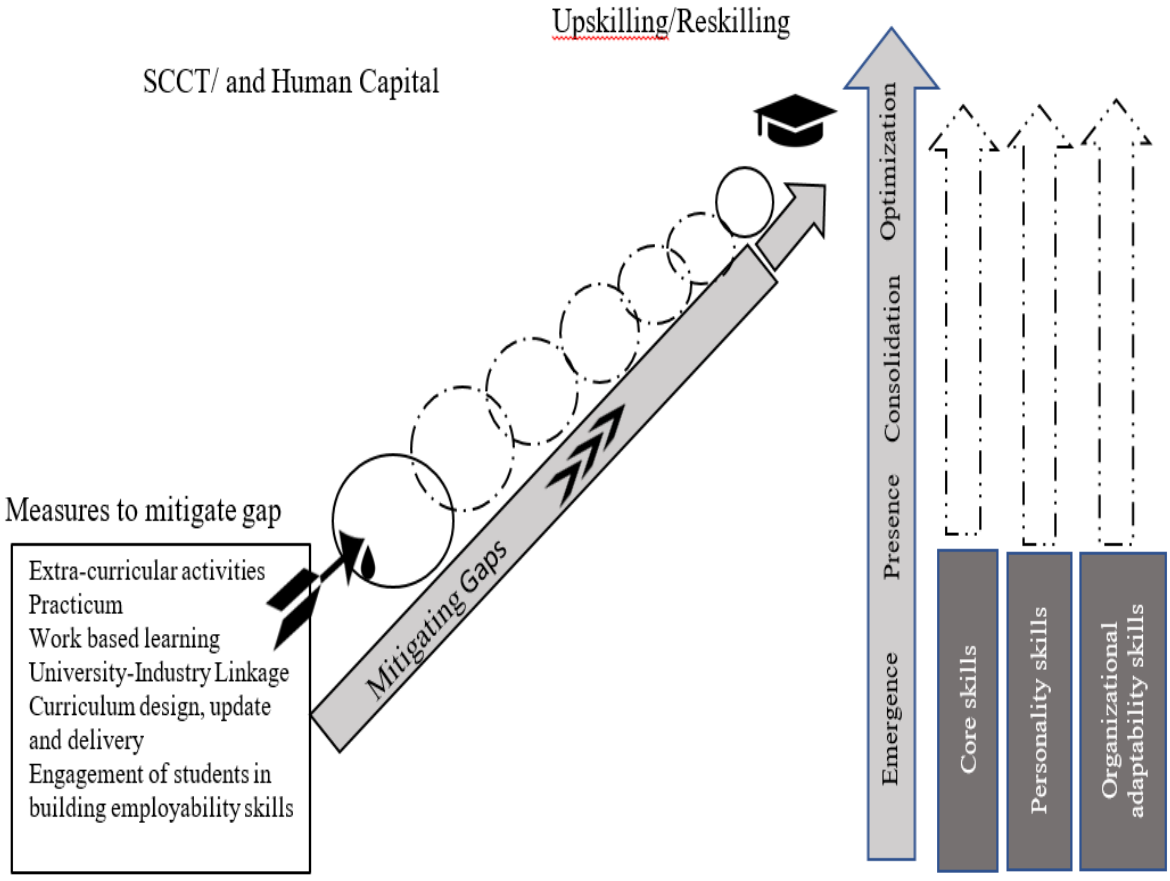
This model (Fig, 6) has been named Proficiency Model for Sustainable Employability (PMSE), and it unveils the existing situation of employability connecting to core skills, personality attributes, and organizational adaptability skills of ICT graduates, which are still at the presence and emergence levels. To excel in their careers, graduates are expected to be at the optimization level. This largely questions the adequacy of present practices for enhancing the required attributes of ICT students at different points of their undergraduate education journey. The policy has an important role in this context, but it is yet to be initiated.

In this context, the minimization of the gap is highly necessary, as the gap hinders employability. As the gap is bridged, the process gradually enhances the employability of graduates. The efforts of the government, universities, and industry are indispensable in this connection, in the process of curriculum design, updates and delivery, and university-industry linkages. In addition, learning through extra-curricular activities helps students to engage in the recent developmental outcomes of ICT. Likewise, students enhance their level of employability through an adequate practicum. Consequently, students become aware of the sectoral needs. Work-based learning is helpful in exploring their career in the ICT sector through their direct engagement with work. Likewise, persistent and focused learning by the graduating students also enhances their human capital. The additional upskilling or reskilling helps to mitigate the problem of obsolete skills because employability in ICT is dynamic.

Besides extracurricular activities and practicum, pre-service training and in-service training can also heighten the level of employability in ICT. Pre-service training is a guided teaching in which the target graduates are asked to perform a particular task in the given professional environment, especially under the supervision of the expert. Under such training program the basics of ICT methods, tools, techniques and systems are introduced with the special focus of the target profession as per the given official requirements. In-service training, on the other hand, is the training organized for the specific employees to equip them with special skills, knowledge, and attitudes to address the existing professional issues. Both trainings are crucial for enhancing employability among the target graduates.

Figure 6

A Proficiency Model for Sustainable Employability



Chapter Conclusion

This study explored three factors, viz., core skills, personality attributes, and organizational adaptability skills. Such factors are also prevalent in other parts of the globe. However, they differ according to the specific context and situations. Likewise, the employability gap differs from place to place. However, the gap explored in the study is large because employability attributes in graduates are yet to be consolidated. Due to this, the reasons for the gap are specific. Most importantly, the contribution of the employers is meaningful but has not been linked to the universities yet. Adequate stakeholder engagement and their commitment to the reform of the sector help to

mitigate the gap and empower graduating students to build their employability skills. The Proficiency Model for Sustainable Employability (PMSE) has been proposed, which connects the existing competencies of ICT graduates and the ICT stakeholders in the process of building their employability.

CHAPTER VII

CONCLUDING THE STUDY

This chapter begins with a synopsis and continues with the inferences of the study. Thereafter, implications of the study for graduating students and employers in the ICT sector, academic institutions, policy-makers, and future researchers were presented. Finally, strategies for key learning with way-outs have been reported.

Synopsis of the Study

The ICT sector provides new avenues for job creation that are regarded as alternatives to tackling the current unemployment. ICTs support innovation that has created new and more flexible forms of employment and work. However, the linkage of ICT employers to academia is lacking or inadequate in many contexts. Employers, on the one hand, question the competencies and standards of ICT graduates, while on the other hand, graduates are unaware of employers' expectations. In this connection, the role of universities is questioned. Therefore, this study was initiated to understand the aspects of employability of ICT graduates and assess the existing gap, and the reasons therefor. The study had three research questions, viz., 1) What factors predict graduate employability as perceived by employers and graduating students in the ICT sector? 2) To what extent do the levels of graduate employability as perceived by employers and graduating students in the ICT sectors differ? 3) How do employers and graduating students explain the reasons behind the existing gaps in graduate employability in the ICT sector? The hypothesis of the study is that perceptions of graduate employability differ between employers and graduating students.

Graduate employability is defined as relating to a context and need (Law, 2018). For this study, employability has been delimited to preparing oneself for

employment, getting into it, and progressing in it sustainably. With its importance in connecting universities to the world of work, the importance of employability skill has been globally highlighted. However, the constructs of employability have not been studied in Nepal. Hence, in this study, the factors associated with graduate employability in the ICT sector in Nepal were explored and analyzed further to capture the constructs of employability from the perspectives of both employers and graduating students. This study can be useful in understanding the skills and their importance in developing the competencies of graduating students. As elaborated later, there is an existing gap between industry and university. This study explored, analyzed, and explained the gap. To analyze and reflect it further, the SCCT and Human Capital Theory were harnessed to explain the missing linkage between career interest, career choice, and performance. With the SCCT, the meaning was sought by explaining how individuals exercise personal agency in their career development. Moreover, from the standpoint of the human capital theory, human beings in the field of the economy have been considered capital, formed and strengthened through education. In this sense, equipping students in universities with due knowledge, skills and attitudes becomes an investment to prepare them for the workplace.

This study was conducted with the reflection on dialectical pluralism, which supports the accommodation of multiple perspectives and helps to produce collaborative knowledge of employability. With this, both objective and subjective exploration were used. For objective exploration, survey research was conducted with a post-positivist stance. By this, factors, levels, and the existing gaps in the graduate employability of the ICT sector were explored. In the subjective exploration, case study methodology was used to understand stakeholders' understanding of the reasons underlying the gap. Thus, the study had two sequential phases, and it followed the

exploratory sequential mixed methods (Creswell & Clark, 2018): the survey first and the case study later.

The survey was conducted among final-year undergraduate students of the ICT sector and employers in the same sector in Nepal. Out of 4321 (population) graduating students, a representative sample of 445 students participated in this study. Similarly, out of 7628 (population) employers, a representative sample of 390 participated in the study. Before data collection, the scale of this study was constructed with a series of consultations using the Delphi approach. At the end of the Delphi process, a six-point Likert scale was developed and piloted. The result was 0.74 in Cronbach alpha and, thus, the scale was consistent. Then, data were collected using a questionnaire from the randomly selected respondents. The data were then entered into SPSS software, and the required tests were completed. Principal factor analysis was used to explore the construct of graduate employability of ICT sector in Nepal. In addition, factors and the items within the factors between what employers expect and what graduating students prepare for were analyzed. The level of graduating students on the dimensions of employability was examined using the competency scale. The result showed that there was a gap between the employers' expectations and graduating students' preparation.

Therefore, in the second phase, a qualitative case study was used to explore and analyze the reasons behind the gaps. In doing so, 19 purposively selected participants (7 graduating students, 7 employers, 3 academicians, and 2 policy-makers) were interviewed in depth. The collected information was then transcribed and analyzed using the MAXQDA software. The results produced six themes. The results obtained from the survey research and case study were integrated and

presented in the joint display. The result was then interpreted with literature and theories.

The result of the survey showed that core skills, personality attributes, and organizational adaptability skills were the factors contributing to graduate employability in the ICT sector in Nepal. The separate factor analysis of employers and students showed some differences among the components of graduating students' preparation and employers' expectation of the students on employability. The attribute of problem-solving, innovativeness, creativity, acumen, ownership, workplace learning, communication skills, technical capabilities, software skills, excellent writing skills, and project management were valued much by employers, whereas prioritization skills were valued by students. The study also showed that in the view of employers, the level of graduate employability of ICT graduates in core skills and personality attributes had just emerged but was not fully present yet. The graduating students viewed these skills as being present but not consolidated to reflect in the workplace. Both employers and graduating students viewed organizational adaptability skills as just emerging and not fully present.

The study also revealed the reasons behind the existing gaps in the employability of ICT graduates in Nepal. The gaps were improper curriculum design, update and delivery, inadequate practicum, insufficient work-based learning, less engagement in extra-curricular activities, weak university-industry relations, and limited engagement of students in building employability skills, as viewed by employers, graduating students, academicians and policymakers. In the end, a proficiency model for sustainable employability was constructed to explain Nepal's employability development. The proficiency model for sustainable employability explains aspirations for employability development in the ICT sector in Nepal.

Conclusions

Graduate employability in the ICT sector in Nepal consists of core skills, personality attributes, and organizational adaptability skills. Of these, core skills are generally developed through ICT education and are, in particular, embedded in the curriculum. However, core skills do not appear to be expected. In the view of both graduating students and employers, there is a struggle in the ICT industry to impart the required core skills to students. The additional efforts of the ICT industry fulfil the needs of the industry to reflect their core learnings in the work setting.

Along with core skills, the personality attributes of employability play an important role in developing competencies in an individual. However, personality attributes normally not only develop within a certain academic program but also connect with the opportunities provided to students for strengthening their personal abilities. The other important dimension is organization adaptability skills. In the era of uncertainties and a dynamic ICT sector, these skills play a vital role in developing a sustainable career for graduates. The opportunity to learn and fail during the academic course reinforces the ability of the graduating students and equips them with the confidence to adapt and succeed in their career journey.

The other important aspect of this study is that there is the existing mismatch between the graduating students' level of employability and the employers' expectation. Though this gap is pervasive, the level of the gap is extreme. The evidence is that the employability dimensions (core skills, personality attributes, and organizational adaptability skills) among ICT graduating students have just emerged or are present on some occasions. However, the dimensions are not consolidated to reflect in the workplace. Such gaps in core skills are alarming although the skills are prioritized in curriculum design. However, stakeholders' engagement in updating the

curriculum is inadequate. The course delivery, including students' exposure to the work setting, is insufficient. In many cases, initiatives with some synergy effects among the stakeholders (university, employers, and government) do not become the agenda of reform but are limited to being a ritual activity. In such a situation, graduate students continuously strive to excel in their skills. However, their effort is limited because they are not sufficiently engaged in their learning process. Some students have a conducive learning environment through the support of their families. Such a limited number of students get exposure to develop employability dimensions.

The study also revealed the reasons behind the gaps in graduate employability in the ICT sector. Outdated curricula and traditional teaching-learning practices hamper the development of employability skills of ICT graduates. The updates and an integrated learning approach are often not in place. In such a situation, stakeholders' engagement becomes imperative. However, strategic and genuine engagements of the stakeholders at the policy level are lacking.

Another important reason for the gap is inadequate practical work during the study and improper learning during the internship/paid work. This is important because ICT students are successful when they get ample opportunity for hands-on experience. Practical-based lab exposures during the initial years of the study support graduates in exploring and developing awareness about their future work. Such practical learning opportunities and work-based learning reduce the existing gaps. Amidst the ongoing technological change, it is difficult for universities to update their curriculum frequently. In such cases, extra-curricular activities mitigate such gaps to some extent. Such activities provide an opportunity for students to update themselves on recent technologies and are also primarily connected with personality development

of students and adaptability of them to the industry. Though they support the overall construct of employability, they are not much prioritized in Nepali universities.

University-industry linkage is an area of concern in the ICT sector. Employers are important in the ICT ecosystem, but their role is not utilized well to demand talents from the university and develop them. On many occasions, meaningful engagement of employers in supporting students for sustainable employability is in question. As a result, the short-term upskilling and reskilling functions in the ICT sector help students to some extent to be up-to-date and learn/unlearn in the era of emerging technology. However, such initiatives are not often endorsed at the policy level to support the more significant number of graduates. In such cases, the existing ecosystem of industry and university hardly ensure opportunities for graduates to be competent and to excel in their endeavors. Consequently, the development of self-efficacy, ability and performance of the graduates remains in question. Importantly, a engagement of all the stakeholders including graduates does not ensure a robust commitment to developing large human pool contributing to the economy of the country.

Implications of the Study

Conclusions drawn based on the findings of this study are useful to ICT students, academic institutions, employers, policy-makers and future researchers to develop the concept of employability of graduates. The implications drawn can support in mitigating the current barriers to enhancing employability skills among ICT graduates. Particularly, effective delivery of the curriculum, engagement of students in extracurricular activities, building skills through practicum, work-based learnings and upskilling/reskilling through short-term training can be involved in the reform of ICT education. The idea has been well-presented in proficiency model for

sustainable employability. In line with the model, some possible actions for researchers, policy makers, employers, academician and students have been identified and presented in Annexure VII. These actions can be executed for the promotions of graduate employability of Nepal. In addition, this study has identified some specific implications for policy makers, ICT industry, academic institutions, ICT students and future researchers.

Implications for Policy

The results of this study showed that the factors associated with graduate employability are not consolidated among graduates, and the gaps in ICT education concerning graduate employability among them persists. To address the gap, the government can play a key role in bringing all the stakeholders together and bridging the gap with policy interventions. With the policy interventions, quality can be assured, and students can also get opportunities in return for their investment. The government can also play a vital role in replicating and scaling the existing practices that are helpful in catering to the needs of ICT education, which has supported graduates in excelling in their skills. The government can also support the industry and academic sectors with proper policies and regulations to encourage the development of the ICT sector. Nepal has the potential to develop its ICT sector because it can export borderless and weightless products. Consequently, the overall economy of the country can be boosted. To achieve such ambitious goals, the government can consider policy reforms and implement progressive policies to cater to the current need for skills development of graduates by addressing the gaps between graduating students' readiness and employers' expectation.

Implications for Industry/Employers

Once they develop an understanding of the existing gaps in ICT education from this study, "growing together" can be the motto for industry and employers. The ICT industry of Nepal is not that big to establish itself as the IT hub of the world. In consideration of its development, the skills of the graduates can be prioritized. In the process, employers with positive mindsets and openness can support developing the capacity of graduates. Industry, in this context, does not have the privilege of waiting for ready-made human resources. Their complaints about deficiencies in ICT graduates will be meaningful only if they initiate appropriate action to address them from their end. Hence, the more industry is open to developing the skills and competencies of graduates, the more benefits it can reap. Collaboration between universities and industries is imperative to improve ICT education, as required by the local and global markets. Industrial support may help students get proper guidance, mentorship, exposure, and work-based learning opportunities. Employers can support academic institutions in the process of updating the curriculum. Industries can also help academic facilitators with exposure for the effective delivery of the curriculum content. Consequently, the costs incurred by industries in training newly hired employees can be reduced. Moreover, industries and universities can work together to reform the existing way of engagement of students in ICT education so that it can make a real difference to the sector.

Implications for Academic Institutions

It is clear from the results of this study that there are several issues to be addressed in ICT education. The core, personality and organizational adaptability skills of the graduating students are not to the extent of employers' expectations. In this situation, academic institutes can support students in building skills and excelling

in their competencies by availing the support of industries. This study also showed the need for an updated curriculum and its proper delivery, the importance of extra-curricular activities, adequate practicum, work-based learning, and the upskilling/reskilling of knowledge. In this situation, academic institutions can support students not only at their level by creating an integrated learning environment for ICT education, but can also act as catalysts among the stakeholders (government, employers and the large numbers of ICT graduates) for the overall improvement of the sector. There are already a few initiatives and good practices implemented in the universities. Such practices can be standardized or formalized so that they can be replicated in all ICT institutions. Moreover, academic institutions can be more proactive in meeting the requirements of the dynamic industry.

Implications for ICT Students

Three major factors determine the employability of ICT graduates. By improving these factors, students can enhance their career readiness and positional competitiveness, aligning with their chosen occupations. Consequently, students can easily accommodate themselves in the work environment after they graduate, equipped with core skills, developed personality attributes and coping strategies for organizational adaptability. Additionally, understanding the existing gaps in the ICT sector and the reasons can therefore be an opportunity for the students to overcome the barriers through their personal initiatives. Knowledge is open in today's world. There are various opportunities students can grab if they are proactive in acquiring knowledge. Students can also put in additional efforts to excel in the area of learning of their choice, to build their own skills and competencies, whether in employment or entrepreneurship.

Implications for Future Researchers

This research explored the factors associated with graduate employability in the ICT industry, their level as perceived by employers and graduating students, the gaps in current education and the reasons thereof. The study showed that there are possibilities for further in-depth research on the issues. Some studies can be conducted in other sectors. Some examples of such studies are:

1. Graduate employability in agriculture, tourism, construction, etc.
2. Graduate employability in a program that blends ICT and other disciplines, such as management;
3. The effectiveness of graduate employability in Nepal, compared to the international practices;
4. Effectiveness of some initiatives for enhancing graduate employability in Nepal;
5. Strengths and challenges relating to the personal initiatives of graduates in developing graduate employability;
6. Cost-benefit analysis with or without the engagement of employers to build employability of graduates;
7. Importance of policy intervention in employability skills development.

Realization and Way Forward

At this point, this researcher remembers the days when she came to KU to pursue her higher studies. Having a background in the non-profit and business sectors, the researcher wanted to work on skilled workforce development. This was later specialized into the work on graduate employability and its gap. In particular, the researcher was dedicated to exploring the gap between employers' expectations and what students prepare for. At this point, the researcher realized that there is a gap in

core skills, personality skills, and organizational adaptability skills. She also knew that the gap could be minimized through the strategies of sensitization of the stakeholders and their meaningful engagement. In the process, academic institutions can work toward their vision of making Nepal an ICT education hub. Likewise, employers can grow together with the universities in developing Nepal as an ICT employment hub in the world. The researcher realized the space of her work. Being a member of the business community, the researcher feels she can play the role of a facilitator in creating awareness, sensitizing the stakeholders, and bringing them together. The researcher sees her space to work in the business sector for their supply, along with demand-driven initiatives. In addition, she has found much scope to conduct research and disseminate results.

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ANNEXURE I

Three Component Factor Analysis of Graduating Students'

Table 21

KMO and Barlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.948
Bartlett's Test of Sphericity	Approx. Chi-Square	10668.560
	df	253
	Sig.	.000

Figure 7

Scree Plot

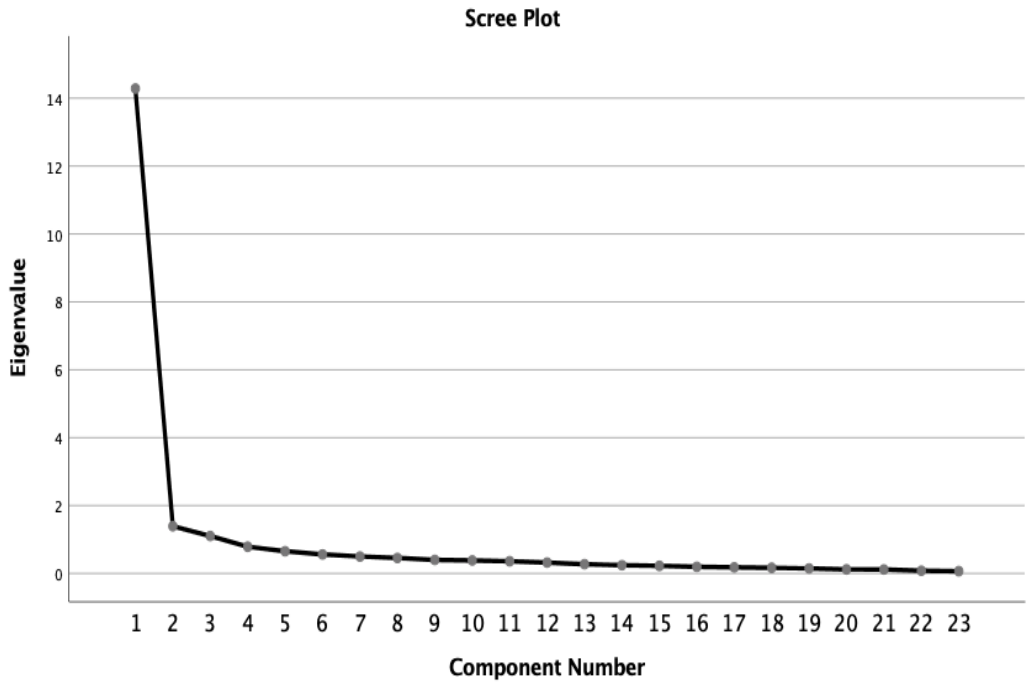

Table 22

Total Variance Explained

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.285	62.109	62.109	14.285	62.109	62.109	6.501	28.267	28.267
2	1.390	6.044	68.153	1.390	6.044	68.153	5.243	22.797	51.064
3	1.102	4.791	72.944	1.102	4.791	72.944	5.032	21.880	72.944
4	.787	3.422	76.366						
5	.655	2.847	79.213						
6	.560	2.433	81.646						
7	.499	2.170	83.815						
8	.456	1.983	85.798						
9	.399	1.736	87.534						
10	.382	1.662	89.196						
11	.360	1.565	90.760						
12	.319	1.388	92.148						
13	.271	1.180	93.328						
14	.243	1.058	94.386						
15	.224	.972	95.358						
16	.195	.849	96.207						
17	.178	.775	96.983						
18	.166	.722	97.705						
19	.148	.643	98.348						
20	.119	.516	98.864						
21	.116	.502	99.367						
22	.079	.344	99.711						
23	.066	.289	100.000						

Table 23

Rotated Component Matrix

Rotated Component Matrix[a]			
	Component		
	1	2	3
Hard working	**.786**	.352	.270
Collaboration skills	**.749**	.232	.417
Flexibility	**.739**	.419	.254
Analytical skills	**.735**	.313	.293
Team work	**.728**	.231	.425
Adaptability	**.707**	.445	.289
Result-oriented attitude	**.688**	.355	.288
Logical reasoning	**.683**	.290	.456
Critical thinking	**.660**	.320	.434
Calmness	.267	**.844**	.191
Ethical	.187	**.743**	.336
Confidence	.353	**.728**	.298
Empathy	.423	**.728**	.266
Stress management	.267	**.710**	.357
Accountable	.455	**.662**	.307
Passionate	.486	**.589**	.313
Excellent verbal english	.236	.319	**.733**
Time management	.274	.336	**.719**
Prioritization skills	.471	.205	**.712**
Digital transformation	.341	.354	**.675**
Technological aptitude	.351	.375	**.655**
Presentation skills	.499	.169	**.651**
Internship experience	.255	.249	**.627**

Factor one was labelled Foundational skills. There were nine items that loaded on this factor, with loadings ranging from 0.786 to 0.660 (explained variance 62.10%). The top item within the factor was Hardworking. Factor one included

characteristics such as hardworking, collaboration skills, flexibility, analytical skills, team work, adaptability, result oriented attitude, logical reasoning and critical thinking.

Factor two was labelled as Personality attributes. There were seven items that loaded on this factor, with the loadings ranging from 0.844 to 0.589 (explained variance 6.04%). The top item within the factor was calmness. Factor two included characteristics such as calmness, ethical, confidence, empathy, stress management, accountable, and passionate.

Factor three was given the label Organizational adaptability skills. There were seven items that were loaded in this factor, with loadings ranging from 0.733 to 0.627 (explained variance 4.79%). The top item within the factor was Excellent verbal english. Factor three characteristics such as excellent verbal english, time management, prioritization skills, digital transformation, technological aptitude, presentation skills and internship experience

ANNEXURE II

Five Component Factor Analysis of Employers

Table 24

KMO and Barlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.957
Bartlett's Test of Sphericity	Approx. Chi-Square	9458.832
	df	496
	Sig.	.000

Table 25

Total Variance Explained

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.456	48.299	48.299	15.456	48.299	48.299	6.045	18.890	18.890
2	2.113	6.602	54.900	2.113	6.602	54.900	5.364	16.763	35.653
3	1.548	4.839	59.739	1.548	4.839	59.739	3.904	12.200	47.854
4	1.237	3.864	63.603	1.237	3.864	63.603	3.258	10.180	58.034
5	1.164	3.638	67.241	1.164	3.638	67.241	2.946	9.207	67.241
6	.838	2.620	69.861						
7	.770	2.406	72.267						
8	.684	2.138	74.406						
9	.628	1.963	76.369						
10	.605	1.890	78.259						
11	.572	1.787	80.046						

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
12	.552	1.725	81.770						
13	.514	1.607	83.377						
14	.495	1.546	84.924						
15	.437	1.367	86.290						
16	.411	1.283	87.574						
17	.391	1.222	88.795						
18	.360	1.126	89.921						
19	.354	1.106	91.027						
20	.347	1.085	92.113						
21	.295	.920	93.033						
22	.288	.901	93.934						
23	.266	.832	94.766						
24	.249	.778	95.544						
25	.248	.775	96.319						
26	.231	.721	97.040						
27	.199	.623	97.663						
28	.187	.584	98.246						
29	.179	.560	98.806						
30	.151	.473	99.279						
31	.123	.384	99.663						
32	.108	.337	100.000						

Figure 8

Scree Plot

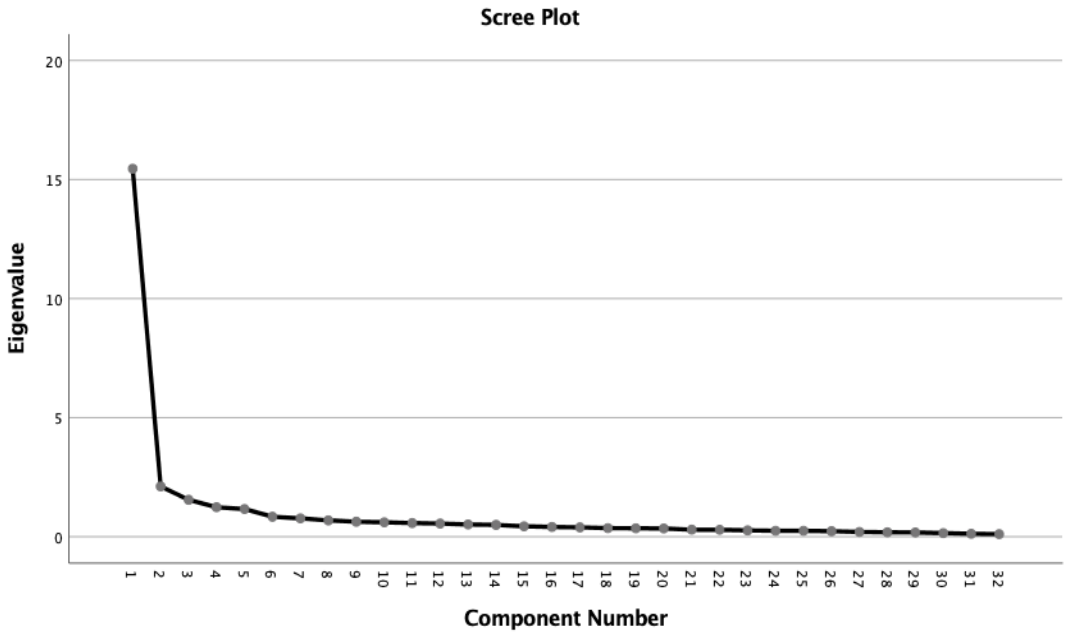

Table 26

Rotated Component Matrix

Rotated Component Matrix[a]					
	Component				
	1	2	3	4	5
Critical thinking	**.825**	.255	.218	.157	.200
Logical reasoning	**.819**	.281	.234	.145	.114
Problem solving	**.742**	.228	.242	.146	.144
Innovative	**.734**	.224	.197	.273	.253
Creativity	**.720**	.268	.214	.269	.175
Analytical	**.639**	.339	.221	.240	.249
Acumen	**.618**	.179	.366	.304	.245
Adaptability	**.566**	.370	.219	.262	.061
Result oriented	**.533**	.445	.365	.243	.125
Ethical	.139	**.732**	.321	-.045	.329
Confidence	.321	**.709**	.169	.282	.039
Calmness	.326	**.697**	.153	.213	.080
Empathy	.388	**.673**	.024	.090	.028
Flexibility	.161	**.657**	.249	.074	.342
Accountable	.159	**.653**	.243	.160	.268
Stress management	.203	**.636**	.228	.090	.395
Passionate	.299	**.577**	.341	.167	.201
Hardworking	.240	**.514**	.452	.255	.129
Collaboration skills	.182	.294	**.734**	.144	.201
Team work	.202	.342	**.684**	.289	.091
Ownership	.341	.325	**.603**	-.002	.178

Rotated Component Matrix[a]					
	Component				
	1	2	3	4	5
Communication skills	.188	.226	**.580**	.130	.368
Workplace learning	.422	.112	**.572**	.146	.148
Internship experience	.365	.130	**.566**	.266	.125
Technical capabilities	.290	.110	.155	**.811**	.110
Technical aptitude	.299	.170	.159	**.784**	.106
Software skills	.112	.224	.264	**.668**	.148
Digital transformation	.272	.086	.059	**.640**	.366
Excellent writing skills	.201	.237	.259	.188	**.717**
Facilitation skills	.070	.377	.158	.082	**.661**
Presentation skills	.428	.138	.066	.202	**.620**
Project management	.217	.149	.270	.271	**.591**

Factor one was labelled Fourth industrial revolution skills. There were nine items that loaded on this factor, with loadings ranging from 0.825 to 0.533 (explained variance 48.29%). The top item within the factor was critical thinking. Factor one included characteristics such as critical thinking, logical reasoning, problem solving, innovative, creativity, analytical, acumen, adaptability and result oriented.

Factor two was labelled as Dispositional skills. There were nine items that loaded on this factor, with the loadings ranging from 0.844 to 0.589 (explained variance 6.60%). The top item within the factor was ethical. Factor two included characteristics such as ethical, confidence, calmness, empathy, flexibility, accountable, stress management, passionate and hardworking.

Factor three was given the label performance management skills. There were six items that were loaded in this factor, with loadings ranging from 0.734 to 0.566 (explained variance 4.83%). The top item within the factor was collaboration skills. Factor three characteristics such as collaboration skills, team work, ownership, communication skills, workplace learning and internship experience.

Factor four was given the label core technical skills. There were four items that were loaded in this factor, with loadings ranging from 0.811 to 0.640 (explained variance 3.86 %). The top item within the factor was technical capabilities. Factor four characteristics such as technical capabilities, technical aptitude, software skills and digital transformation.

Factor five was given the label core technical skills. There were four items that were loaded in this factor, with loadings ranging from 0.717 to 0.591 (explained variance 3.63 %). The top item within the factor was excellent writing skills. Factor five characteristics such as excellent writing skills, facilitation skills, presentation skills and project management.

ANNEXURE III

Questionnaire for the Graduating Students

सुचना तथा संचार प्रविधि क्षेत्रको रोजगारीता विषयक अध्ययन प्रश्नावली

यहाँलाई नमस्कार,

काठमाण्डौ विश्वबिद्यालय, स्कुल अफ एजुकेशनमा विद्यावारिधि (PhD) तहमा शोध (thesis) को लागि म अमृता शर्मा यो सर्वेक्षण गर्दैछु। सुचना तथा संचार प्राविधि र त्यस क्षेत्रको रोजगारितामा भएकोले यो अध्ययनमा यहाँलाई यथार्थ जवाफ दिनुहुन अनुरोध गर्दछु। यस अध्ययनबाट प्राप्त सबै तथ्याङ्कहरु गोप्य रुपमा राखिनेछ र सम्पूर्ण सुचनाहरु यस अनुसन्धान कार्यका लागि मात्रै प्रयोग गरिने छ। सर्वेक्षणका लागि करिव २० मिनेटको समय लाग्ने छ। अध्ययन् पश्चात शोधपत्र हात्तिवन स्थित काठमाण्डौ विश्वबिद्यालयको पुस्तकालयमा राखिनेछ। यहाँहरुको सहयोगको लागि आशा एंव विश्वास लिएकी छु। धन्यवाद।

खण्डः क परिचयः (Introduction)

१. उत्तरदाताको नामः (Name of the Respondent)_____

२. उमेरः(Age)_____

३. लिङ्ग (Sex) पुरुष Male ☐ महिला (Female) ☐ अन्य (Other) ☐

४. जाति/जनजातिः (Ethnicity) ब्राम्हण (Brahmins) ☐ क्षेत्री (Chettri) ☐ जनजाति anajati ☐ दलित (Dalit) ☐
अन्य, उल्लेख गर्नुहोस_ (Others, Specify)_____
_____

५. स्थाथी ठेगाना जिल्ला (Permanent Address)

(District)_____

प्रदेश नम्बर (Province) _____

भौगोलिक अवस्थिति (Geographical Features): हिमाल (Mountain) ☐ पहाड (Hills) ☐
तराई (Terai) ☐

परिवेश (Context): शहरी (Urban) ☐ ग्रामीण (Rural) ☐

६. व्यवसाय (Occupation):

बुवाको व्यवसाय (Mother's Occupation) _____

आमाको व्यवसाय (Father's Occupation) _____

७. तपाईले SEE गर्नु भएको विद्यालयको प्रकार (From where did you complete your SEE) ?

संस्थागत(Institutional/Private School) ☐ सामुदायिक (Community/Government ☐ School)

८. अहिले तपाई कुन Semester मा अध्ययनरत हुनुहुन्छ ? पाँचौ 5th ☐ छैठौं6th ☐ सातौ7th ☐ 8th आठौ ☐

९. तपाई कुन विषयमा बिज्ञता बढाउन चाहनुहुन्छ (Your interest for specialization) ?

_____

१०. तपाईले इन्टर्नशिप गर्नु भएको छ (Did you do internship)?

छ (Yes)☐ छैन (No) ☐ छ भने कुन ठाँउमा (If yes, where)?

_____ कति समय (How long)?

११. तपाईले किन सुचना प्रविधि संचार विषय पढ्नु भयो । (why did you choose ICT Education)?

आफ्नो इच्छाले (Self Interest) ☐ परिवारको इच्छाले (Family Interest) ☐

साथीभाईको करकाप ☐ यस क्षेत्रको महत्व बुझेर (understanding the important of ☐ sector)

अन्य भए उल्लेख गर्नुहोस् (If others, please specify) _____

१२. तपाईले कुनै काम सुरु गर्नु भएको छ(Have you started working in addition to your study)?

छ (Yes) ☐ छैन (No) ☐

छ भने कहाँ (If Yes, where) office ☐ Freelance ☐

कस्तो काम (What type of work) coding ☐ Design ☐ Soft. Dev. ☐

Hard ware ☐

Gaming ☐ Animation ☐ Testing ☐ Others specify

_____

१३. आफ्नो अध्ययन बाहेक तपाईले कुनै तालिम लिनु भएको छ (Did you get any training other than your ☐) छ (Yes) ☐ छैन (No)

यदि छ भने कुन तालिम (If yes, what type of training) _____

कृपया प्रत्येक वाक्यलाई ध्यानपूर्वक अध्ययन गरी यहाँको सहमति वा असहमतिलाई (६- पूर्ण रुपमा सहमत देखि १- अति थोरै सहमत) लाई चिन्ह लगाई जवाफ दिनुहुन अनुरोध गर्दछु ।

खण्ड: क

६. पूर्ण रुपमा सहमत (Fully Agree)	**५.धेरै जसो सहमत**(Mostly) Agree)	**४.ठिकैसहमत** (Agree)	**३.थोरै सहमत** (Somewhat Agree)	**२.अलि थोरै सहमत** (Slightly Agree)	**१.अति थोरै सहमत** (Very slightly Agree)

सुचना तथा संचार प्रविधि अध्ययनले मैले भविष्यमा गर्ने कामहरुमा (IT Education supported me at my future work to)

१	जिम्मेवार हुन सिकाएको छ (be accountable)	६	५	४	३	२	१
२	सम्यम हुन सिकाएको छ (be calm)	६	५	४	३	२	१
३	आत्माविश्वासका साथ काम गर्न सिकाएको छ (be confident)	६	५	४	३	२	१
४	अरुको भावना बुझ्न सक्ने बनाएको छ (understand feelings of other)	६	५	४	३	२	१
५	नैतिकवान भएर काम गर्न सिकाएको छ (work with strong morals)	६	५	४	३	२	१
६	लचिलो हुन सिकाएको छ (be flexible)	६	५	४	३	२	१
७	मिहिनेती हुन सिकाएको छ (work hard)	६	५	४	३	२	१
८	आउने तनावको स्थितिलाई व्यवस्थापन गर्न सिकाएको छ (manage stress)	६	५	४	३	२	१
९	उत्साहपूर्वक काम गर्न सिकाएको छ (acquire intense enthusiasm)	६	५	४	३	२	१
१०	सकृय हुन सिकाएको छ (be proactive)	६	५	४	३	२	१
११	परिणाम उन्मूख हुन सिकाएको छ (have result-oriented attitude)	६	५	४	३	२	१
१२	अनुशाशित हुन सिकाएको छ (be self- disciplined)	६	५	४	३	२	१
१३	विवेकपूर्ण ढङ्गले अघि बढ्न सिकाएको छ (work in smart way)	६	५	४	३	२	१

६. पूर्ण रुपमा सहमत (Fully Agree)	५.धेरै जसो सहमत (Mostly) Agree)	४.ठिकै सहमत (Agree)	३.थोरै सहमत (Somewh at Agree)	२.अलि थोरै सहमत (Slightly Agree)	१.अति थोरै सहमत (Very slightly Agree)

सुचना संचार तथा प्रविधि अध्ययनले मलाई मैले भविष्यमा गर्ने कामहरुमा (IT Education supported me at my future work to)							
१४	परिस्थिति अनुकुल आफुलाई बदल्न सिकाएको छ (adapt myself as per the situation)	६	५	४	३	२	१
१५	निर्णय गर्दा छिटोछरितो हुन सिकाएको छ (make quick decision)	६	५	४	३	२	१
१६	विश्लेषण गर्न सिकाएको छ (be analytical)	६	५	४	३	२	१
१७	सृजनात्मक हुन सिकाएको छ (be creative)	६	५	४	३	२	१
१८	नविनतम ढङ्गले काम गर्न सिकाएको छ (be innovative)	६	५	४	३	२	१
१९	फरक ढङ्गले सोच्न सक्ने व्यक्ति बनाएको छ (be a person with critical thinking in my responsibilities)	६	५	४	३	२	१
२०	तार्किक क्षमताको प्रयोग गर्न सक्ने बनाएको छ (be able to work with logical reasoning)	६	५	४	३	२	१
२१	आइपर्ने समस्याको समाधान गर्न सक्ने बनाएको छ (cultivate problem solving skills in my career)	६	५	४	३	२	१
२२	परिवर्तित प्रविधिमा बुद्धिमतापूर्वक काम गर्न सिकाएको छ (work wisely with knowledge in changing technology)	६	५	४	३	२	१
२३	नयाँ सिकाइको लागि सदैव तयार रहन सिकाएको छ (be prepared for updated learning)	६	५	४	३	२	१
२४	उद्यमशिलताका शिपहरु प्रयोग गर्न सिकाएको छ । (utilize entrepreneurial skills to my future work)	६	५	४	३	२	१
२५	पहिले गरेको कामको अनुभवको प्रयोग गर्न सिकाएको छ । (utilize prior work experience)	६	५	४	३	२	१
२६	मैले इन्टर्नशिप गर्दाका अनुभव प्रयोग गर्न सिकाएको छ । (contribute my experience of internship)	६	५	४	३	२	१
२७	अपनत्व लिन सिकाएको छ (take ownership of my work)	६	५	४	३	२	१

६. पूर्ण रुपमा सहमत (Fully Agree)	५.धेरै जसो सहमत (Mostly) Agree)	४.ठिकै सहमत (Agree)	३.थोरै सहमत (Somewhat Agree)	२.अलि थोरै सहमत (Slightly Agree)	१.अति थोरै सहमत (Very slightly Agree)

सुचना संचार तथा प्रविधि अध्ययनले मलाई मैले भविष्यमा गर्ने कामहरुमा (IT Education supported me at my future work to							
२८	आपसी सहयोग साथ काम गर्न सिकाएको छ (work in collaboration)	६	५	४	३	२	१
२९	समुहमा मिलेर काम गर्न सिकाएको छ (work in team)	६	५	४	३	२	१
३०	प्रभावकारी ढङ्गले आफ्ना विचारहरु राख्न सिकाएको छ । (communicate in well manner)	६	५	४	३	२	१
३२	स्पष्ट ढङ्गले लेख्न सिकाएको छ । (write in excellent manner)	६	५	४	३	२	१
३३	आफुले गरेका कामहरुको अभिलेख राख्न सिकाएको छ । (record my work)	६	५	४	३	२	१
३४	प्रस्तुतीकरण गर्न सिकाएको छ (develop presentation skills)	६	५	४	३	२	१
३५	सहजीकरण गर्न सिकाएको छ (use facilitation skills)	६	५	४	३	२	१
३६	प्राथमिकता छुट्टयाउन सिकाएको छ । (prioritize my work)	६	५	४	३	२	१
३७	समयको उचित व्यवस्थापन गर्न सिकाएको छ । (work with proper time management)	६	५	४	३	२	१
३८	आइपर्ने तनावको स्थिति सामना गर्न सिकाएको छ । (cope stressful situation)	६	५	४	३	२	१
३९	हार्डव्येरको प्रयोग गरी काम गर्न सिकाएको छ । (utilize computer hardware skills)	६	५	४	३	२	१
४०	सफ्टव्येरको प्रयोग गरी काम गर्न सिकाएको छ । (utilize computer software skills)	६	५	४	३	२	१
४१	प्राविधिक क्षमताको प्रयोग विकाश गर्न सिकाएको छ । (utilize my technical capabilities at work)	६	५	४	३	२	१
४३	समय अनुसार प्राविधिक ज्ञान सिक्ने कुरा सिकाएको छ । (update myself on latest technologies)	६	५	४	३	२	१
४४	डिजिटल रूपान्तरणका बारेमा सिकाएको छ। (be aware on digital transformation)						
४५	डिजिटल बिभाजनका बारेमा सिकाएको छ । (be aware on digital divide)						

यहाँको सहयोगको लागि धेरै धेरै धन्यवाद !

ANNEXURE IV

Questionnaire for the Employers

सुचना तथा संचार प्रविधि क्षेत्रको रोजगारीता विषयक अध्ययन प्रश्नावली

यहाँलाई नमस्कार,

काठमाण्डौ विश्वबिद्यालय, स्कुल अफ एजुकेशनमा विद्यावारिधि (PhD) तहमा शोध (thesis) को लागि म अमृता शर्मा यो सर्वेक्षण गर्दैछु । सुचना तथा संचार प्राविधि र त्यस क्षेत्रको रोजगारितामा भएकोले यो अध्ययनमा यहाँलाई यथार्थ जवाफ दिनुहुन अनुरोध गर्दछु । यस अध्ययनबाट प्राप्त सबै तथ्याङ्कहरु गोप्य रुपमा राखिनेछ र सम्पूर्ण सुचनाहरु यस अनुसन्धान कार्यका लागि मात्रै प्रयोग गरिने छ । सर्वेक्षणका लागि करिव २० मिनेटको समय लाग्ने छ । अध्ययन् पश्चात शोधपत्र हात्तिवन स्थित काठमाण्डौ विश्वबिद्यालयको पुस्तकालयमा राखिनेछ । यहाँहरुको सहयोगको लागि आशा एंव विश्वास लिएकी छु । धन्यवाद ।

खण्डः ख परिचयः (Introduction)

१. उत्तरदाताको नामः (Name of the Respondent)

_____ २. पद

(Position)_____ ३. उमेरः(Age)_____

४. संस्थाको नाम (Name of Company / Institution)

_____

५. कर्मचारी संख्या (Number of Employees) _____

६. संचार सूचना प्रविधिका कर्मचारी संख्या (Number of ICT Employees)

_____

७. तपाईको कम्पनीले नेपाल बाहिर कुन देशको काम गरिरहेको छ (Which countries' projects are you working with other than of Nepal)?

_____

८. तपाईको कम्पनीमा ईन्टर्नशिप लिनुहुन्छ (Do you recruit interns in your Company)?

९ं तपाई भर्खर पढाई सकिएर आएको विद्यार्थीसँग काममा संतुष्ट हुनुहुन्छ (Are you Satisfied with newly recruited gradu☐ छ (Yes) ☐ छैन(No)

हुनुहुन्छ भने किन (If Yes why) ?_____

हुनुहुन्न भने किन (If No why)

?_____

१०. नयाँ कर्मचारीलाई कति समय तालिम दिनु हुन्छ (How long do you train your newly recruits) ?_____ दिन (Days)

११. रोजगारीताको विकाशका लागि शैक्षिक संस्थाका लागि के सुझाव दिनुहुन्छ (What do you suggest academic intuition for the development of employability skill)?

_____

व्यक्तिगत विशेषताहरु

भर्खरै स्नातक गरेका कर्मचारी आफ्नो संस्था/कम्पनीमा नियुक्ति गर्नुपर्दा हामी यस्ता व्यक्ति छान्छौं, जो

we recruit fresh graduates at our company / institution who can

खण्डः ख

६. पूर्ण रुपमा सहमत (Fully Agree)	५.धेरै जसो सहमत(Mostly Agree)	४.ठिकै सहमत (Agree)	३.थोरै सहमत(Somewhat Agree)	२.अलि थोरै सहमत (Slightly Agree)	१.अति थोरै सहमत (Very Slightly Agree)

१	जिम्मेवारी भएर काम गर्न सक्नु हुन्छ । (be accountable)	६	५	४	३	२	१
२	सम्यमताका साथ काम गर्न सक्नु हुन्छ । (be calm while dealing with any problems work)	६	५	४	३	२	१
३	आत्माविश्वासका साथ काम गर्न सक्नु हुन्छ । (be confident with their work)	६	५	४	३	२	१
४	अरुको भावना बुझेर काम गर्नहुन्छ । (understand feelings of other)	६	५	४	३	२	१
५	नैतिकताका साथ काम गर्नु हुन्छ । (work with morals)	६	५	४	३	२	१
६	लचिलो भएर काम गर्न सक्नु हुन्छ । (be flexible)	६	५	४	३	२	१
७	मिहिनेती हुनु हुन्छ । (work hard)	६	५	४	३	२	१
८	आउने तनावको स्थितिलाई व्यवस्थापन गर्न सक्नुहुन्छ । (manage stress)	६	५	४	३	२	१
९	उत्साहपूर्वक काम गर्नु हुन्छ । (acquire intense enthusiasm)	६	५	४	३	२	१
१०	सकृयाताका साथ काम गर्न सक्नु हुन्छ । (be proactive)	६	५	४	३	२	१
११	परिणाममुखी भई काम गर्न सक्नु हुन्छ । (have result-oriented attitude)	६	५	४	३	२	१
१२	अनुशाशित भई काम गर्न सक्नु हुन्छ । (be self-disciplined)	६	५	४	३	२	१
१३	विवेकपूर्ण ढङ्गले अघि बढ्न सक्नु हुन्छ । (work in smart way)	६	५	४	३	२	१

६. पूर्ण रुपमा सहमत (Fully Agree)	५.धेरै जसो सहमत (Mostly Agree)	४.ठिकै सहमत (Agree)	३.थोरै सहमत (Somewhat Agree)	२.अलि थोरै सहमत (Slightly Agree)	१.अति थोरै सहमत (Very slightly Agree)

भर्खरै स्नातक गरेका कर्मचारी आफ्नो संस्था/कम्पनीमा नियुक्ति गर्नुपर्दा हामी यस्ता व्यक्ति छान्छौं, जो

we recruit fresh graduates at our company / institution who can

१४	परिस्थिति अनुकुल आफुलाई बदल्न सक्नु हुन्छ । (adapt as per the situation)	६	५	४	३	२	१
१५	निर्णय गर्दा छटोछरितो हुनुहुन्छ । (make quick decision)	६	५	४	३	२	१
१६	विश्लेषण गर्न सक्नु हुन्छ । (be analytical)	६	५	४	३	२	१
१७	सृजनात्मक हुनु सक्नु हुन्छ । (be creative)	६	५	४	३	२	१
१८	नविनतम ढङ्गले काम गर्न सक्नु हुन्छ । (be innovative)	६	५	४	३	२	१
१९	फरक ढङ्गले सोच्न सक्नु हुन्छ । (be a person with critical thinking in responsibilities)	६	५	४	३	२	१
२०	तर्क गर्न सक्नु हुन्छ । (be able to work with logical reasoning)	६	५	४	३	२	१
२१	आफ्नो काममा आइपर्ने समस्याको समाधान गर्न सक्नु हुन्छ । (cultivate problem solving)	६	५	४	३	२	१
२२	परिवर्तित प्रविधिमा बुद्धिमतापूर्वक काम गर्न सक्नु हुन्छ । (work wisely with knowledge in changing technology)	६	५	४	३	२	१
२३	नयाँ सिकाइको लागि सदैव तयार हुन सक्नु हुन्छ । (be prepared for update learning)	६	५	४	३	२	१
२४	उद्यमशिलताका शिपहरु प्रयोग गर्न सक्नु हुन्छ । (utilize entrepreneurial skills)	६	५	४	३	२	१
२५	पहिले गरेको कामको अनुभवको प्रयोग गर्न सक्नु हुन्छ । (utilize work experience)	६	५	४	३	२	१
२६	इन्टर्नशिप गर्दाका अनुभव प्रयोग गर्न सक्नु हुन्छ । (utilize experience of internship)	६	५	४	३	२	१
२७	आफुले गरेको कामको उपनत्व लिन सक्नु हुन्छ । (take ownership of work)	६	५	४	३	२	१

६. पूर्ण रुपमा सहमत (Fully Agree)	५.धेरै जसो सहमत (Mostly Agree)	४.ठिकै सहमत (Agree)	३.थोरै सहमत (Somewhat Agree)	२.अलि थोरै सहमत (Slightly Agree)	१.अति थोरै सहमत (Very slightly Agree)

भर्खरै स्नातक गरेका कर्मचारी आफ्नो संस्था/कम्पनीमा नियुक्ति गर्नुपर्दा हामी यस्ता व्यक्ति छान्छौं, जो **we recruit fresh graduates at our company / institution who can**							
२८	आपसी सहयोगमा काम गर्न सक्नु हुन्छ । (work in collaboration)	६	५	४	३	२	१
२९	समुहमा मिलेर काम गर्न सक्नु हुन्छ । (work in team)	६	५	४	३	२	१
३०	प्रभावकारी ढङ्गले आफ्ना विचारहरु राख्न सक्नु हुन्छ । (communicate in well manner)?	६	५	४	३	२	१
३१	आफुले गरेका कामहरुको अभिलेख राख्न सक्नु हुन्छ । (record their work)	६	५	४	३	२	१
३२	स्पष्ट ढङ्गले लेख्न सक्ने हुन्छ । (write in in excellent manner)	६	५	४	३	२	१
३३	प्रस्तुती गर्न सक्नु हुन्छ (have presentation skills)	६	५	४	३	२	१
३४	सहजीकरण गर्न सक्नु हुन्छ । (use facilitation skills)	६	५	४	३	२	१
३५	प्राथमिकता छुट्टयाउन सक्नु हुन्छ । (prioritize their work)	६	५	४	३	२	१
३६	समयको उचित व्यवस्थापन गर्न सक्नु हुन्छ । (work with proper time management)	६	५	४	३	२	१
३७	काममा आइपर्ने तनावपूर्ण स्थितिको सामना गर्न सक्नु हुन्छ । (cope stressful situation)	६	५	४	३	२	१
३८	हार्डव्येरको ज्ञानको प्रयोग गर्न सक्नु हुन्छ । (utilize computer hardware skills)	६	५	४	३	२	१
३९	सफ्टव्येरको ज्ञानको प्रयोग गर्न सक्नु हुन्छ । (utilize computer software skills)	६	५	४	३	२	१
४०	प्राविधिक क्षमताको प्रयोग गर्न सक्नु हुन्छ । (utilize technical capabilities at work)	६	५	४	३	२	१
४१	प्राविधिक ज्ञान समय अनुसार सिक्दै जान सक्नु हुन्छ । (update themselves on latest technologies)	६	५	४	३	२	१
४२	डिजिटल रूपान्तरणका बारेमा जान्नु हुन्छ। (be aware on digital transformation)?	६	५	४	३	२	१
४३	डिजिटल बिभाजनका बारेमा जान्नु हुन्छ। (be aware on digital divide)?	६	५	४	३	२	१

ANNEXURE V

Questions for graduating students
How do you think that what you have studied are in line with the local trend in ICT education? If so, why?
How do you think that what you have studied are in line with the global trend in ICT education? If so, why?
How does the university engage you or ask you in the process of designing/updating the curriculum? Are you asked for suggestions for changes in curriculum?
How do you find your teacher's/facilitator's delivery of the curriculum? Do you think they do well? If so, why? What can be done better?
How do you explain the availability of space and equipment's for practical at your college? What are the challenges you face? How can you learn in a better way? Any specific examples you can provide for this?
How do you explain the availability of well-equipped lab and internet facilities at college? What are the challenges you face? How can you learn in better way? Any specific examples you can provide for this?
How do you explain an opportunity to learn about your sector during your study? Exposures? Field visits? Any talk show or tech icons you got to know and got an opportunity to learn from them?
How do you explain the support for the extra activities you organized from your college? Why do you think it is important for students to be part of it? Any example on the moment you have felt it is important?
How do you explain the opportunities to work with a mentor during your study? Why do you think it important to have mentors? How can it be helpful to students? Any examples?
How do you explain the effectiveness of internship for your future or it is just a formality? Explain your experience during internship? How do you find it as learning opportunity? Can you share your experience on internship?
Are there any job fairs at your college or anywhere you know in your sector? How do you explain the importance of job fairs as a final year student?
How do you explain the support on career like counselling or suggestions?
In your opinion, if industry and academia work together, will it be helpful to students? If so, how? In what areas should they collaborate?

ANNEXURE VI

Questions for Employers
How do you explain your satisfaction with the course design/ update in the university? Are you ever invited for consultation? If yes, why? What did you do? If not, have you heard of it? What may be the reason?
How often are employers invited to speak to the class?
How important is practical knowledge for students? Why? What contributions are you making to provide opportunities for students? Is there any discourse or discussion at the policy level for this?
How do you explain about providing your space for learning opportunities to students? Are there any organized activities /discussion/discourse to support students on it?
Guest lecture, experience sharing, how often you visit students or interact with them with the intention to build their capacity? Do you feel that the exposure helps students? Why do you feel so? Any specific examples you can share?
How do you support these active ties or sponsor to encourage students? If so, why?
How important do you think mentoring will be in the ICT sector? Are you involved in any competitions for students?
How do you explain the acceptance of interns in your organization? How helpful are they on mainstream work? How long do you think the internship program should be to make it effective? Is it just a formality or do students learn much? Will these programs bother your regular work or the assigned supervisors?
How do you explain the apprenticeship program on ICT sector? How do you think this will help students in the smooth transition to work? How can this be done?
How do you explain the importance of job fair related to ICT? Will it help graduates? Do you have any example of it? Do you think it is important and if so, who should be responsible for it?
Are you involved in counselling students? How do you think can improve their motivation and learning attitude? How can we build them strong in terms of making them work-ready? Who should be involved? Who are responsible for this?
How often do you meet with an academician? Are there any discourses or discussions on industry-university collaboration? If so, could you please elaborate? Do you think sufficient efforts have been put in? What more can be done?

ANNEXURE VII

Possible Actions of Stakeholders of Graduate Employability

Researchers

1. can conduct the action research on the proficiency model proposed by this study,
2. can conduct similar studies in other sectors such as agriculture, tourism, and construction which support in contributing to the economy of the country,
3. can conduct a comparative study with randomized control trial (RCT) with or without interventions of graduate,
4. can conduct studies to know effectiveness of current practices to enhance employability,
5. can study on ICT education relating with future of work,
6. can carry out research on a need of human resources on ICT enabled services,
7. can conduct study on potentials of upskilling the current ICT workforce for Nepal.
8. can study in signaling the knowledge, skills, and performances of ICT graduates of Nepal,
9. can research on the effectiveness of some initiations on developing employability skills in Nepal,
10. can assess personal initiations of graduates in developing employability skills,
11. can study the effectiveness of extra- curricular activities of the academic institution for ICT graduates,
12. can conduct cost-benefit analysis of the industry investing in graduating students of ICT,
13. can study the employability of mid-level, senior level employees in ICT sector,

Policy Makers

1. can formulate policy on bridging the existing gaps such as practicum, work-based learnings,

2. can support on replicating and scaling the good practices of graduate employability,
3. can develop the policies to support the skill development of human resources in the ICT sector,
4. can formulate a policy to coordinate stakeholders of ICT sectors,
5. can promote graduate employability in ICT education for economic development of the country,
6. can promote/encourage/support/incentivize graduate employability to develop ICT as an export industry,
7. can encourage tech start-ups for graduate employability,

Employers of the ICT sector

1. can organize and develop institution to support the ICT community including but not limited to university rather than working in isolation
2. can assess the global and current market needs and dissemination among universitites and policy makers,
3. can promote country branding as an ICT hub to encourage youth to build their employability skills,
4. can prioritize skill development in universities as a key agenda in policy advocacy and lobbying,
5. can scale up the initiatives to minimize the gaps that hinders employability among graduates,
6. can engage in career guidance, mentorship, exposure, work-based learning opportunities of ICT graduating students,
7. can engage in meaningful way for curriculum design, delivery, and update,
8. can support the research activities of academic institutions and development partners, and
9. can support academic institutions on micro-credentials and badges of ICT education.

Academia

1. can assess the market demand for basic and specific skills require for their students,

2. can encourage regular and meaningful engagement of employers in curriculum design, delivery, and update,
3. can focus on proper delivery of the curriculum relating to practices,
4. can prioritize conceptual clarity to their students from theoretical knowledge to practical aspects,
5. can promote work-based learning and apprenticeship to promote graduate employability,
6. can encourage adequate engagement of students in extracurricular activities and work-based learnings,
7. can provide opportunities and exposures to students to develop their employability,
8. can motivate and encourage a linkage with the industry,
9. can standardize and formalize the good and successful practices of graduate employability,
10. can encourage students on their self-skill development initiatives.

Students

1. can be aware and be proactive to fulfill the existing gaps about their expected and actual employability skills,
2. can understand the market needs and their preparedness on graduate attributes,
3. can put additional efforts to get hands-on experience of job market from the beginning of the courses,
4. can access the online resources available to build core skills and soft skills required in the sector,
5. Can push themselves to excel in the area of interest to be competent after their graduation.

ANNEXURE VIII

Literature Review Matrix

Component/s	Resources
Employability constructs	Feintuch, 1955; Becker 1964 ; Bridges 1993; Hillage and Pollard 1998; Stevenson 1999; Gonazalez and Wagennar, 2003; McQuaid and Lindsay 2005; Yorke 2006; Drenan, 2008; Garcia and Rolf 2008; Storen & Aamodt, 2010; Yorke, 2010; Cumming, 2010; Blom & Saeki, 2011; Velasco, 2012; Hamburg and Rolf, 2015; Kaushal 2016; Govender & Wait, 2017; Pitan, 2017;Tomlinson, 2017; Law, 2018; Chen et al., 2018; Neilson, 2018; Sharma, 2019; Smaldone et al., 2022
Models of employability	Wright, 2001; Knight and Yorke 2002; Pool & Sewell, 2007; Govender & Wait, 2017; Copps & Plimmer, 2013;
Practices across the globe on employability	Chickering & Gamson, 1987; Knight & Yorke, 2002; Barrie, 2004; Deny & Reid, 2005; Raban, 2006; Franz, 2008; Muldoon, 2009; Yorke, 2010; Yusof & Jamaluddin, 2015; Tomlinson, 2016; Bendixen & Jacobsen, 2017; Bargsted, 2017; Bennett, 2018; GCA, 2020; HECSU, 2020; NAGCAS, 2020; CACEE, 2020; IAEVG, 2020; AGCAS, 2020;
Development of employability	Feintuch, 1955; Chickering & Gamson, 1987;Ever et al., 1998; Harvey, 2001; Forrier & Sels, 2003; Kwok, 2004; Deny & Reid, 2005; Harvey, 2005; Boden & Nedeva, 2010; Yorke, 2010; Tymon, 2013; Bennett, 2018; Mcllveen, 2018; Nielsen, 2018; Mgaiwa, 2021; Sambell et al., 2021; Schaper, 2020
Linkages between industry and academia	Etzkowitz and Leydesdorff, 2000; Cox & King, 2006; Bhattarai, 2009; Ehiyazaryan & Barraclough, 2009; Husain et al., 2010; Saad & Kay, 2014; Owens & Tibby, 2014; Vaaland & Ishengoma, 2016; Abdrewartha &

	Harvey, 2017; Law, 2018; Gill, 2018
Human capital theory	Becker, 1985;Rothaermel, 2013; Mahoney & Kor, 2015
Social cognitive theory	Lent et al., 2002
Core skills	Moore, 2010; Flectcher-brown, 2015; Pinto, 2017; Tomlinson & Holmes, 2017; Andrewartha & Harvey, 2017;Klimas & Wojcik, 2018; Sehgal, 2018; Suleman, 2018;Tholen, 2019; Prikshat, 2019;Fraser et al., 2019;Vasudevan, 2021;
Personality skills/attributes	Lees, 2002; Knight and Yorke, 2003; Knight and Yorke, 2004; Seleim & Khalil, 2011;Finch et al.,2016; Misra & Khurana, 2018; Synard & Gazzola, 2018; Maxwell & Armellini, 2018; Meehan & Howelles, 2019; Tymon et al., 2020; Hu et al., 2021
Organizational adaptability skills	Hollister et al., 2017; Stadtler et al., 2017;Succi & Canovi, 2019; Succi & Canovi, 2019; Kornelakis & Petrakaki, 2020; Sony & Naik, 2022
Soft skills	Nghia, 2018; Abbasi, 2018; Baird, 2019;Anicic & Buselic, 2021;
Hard skills	Chinzer & Russo, 2018; Misra & Khurana, 2018
Communication skills	Tymon, 2013;William et al., 2019; Baird & Paryitan, 2019; Kamil & Muhammad, 2021; Guardia et al., 2021
Factors of employability	Gonazalez and Wagennar, 2003; McQuaid and Lindsay 2005; Yorke 2006; Drenan, 2008; Garcia and Rolf 2008; Storen & Aamodt, 2010; Yorke, 2010; Cumming, 2010; Blom & Saeki, 2011; Velasco, 2012; Hamburg and Rolf, 2015; Kaushal 2016; Govender & Wait, 2017; Pitan, 2017;Tomlinson, 2017; Law, 2018; Chen et al., 2018; Neilson, 2018; Sharma, 2019; Smaldone et al., 2022
Workplace learnings	Knouse & Fontenot, 2008; Pan et al., 2018; Inceoglu et al., 2019;

ANNEXURE IX

Employability factors and its contributors

Factors	contribution
Two categories: personal qualities and interpersonal skills	Velasco, 2012
Nine categories: communication, team work, information technology, planning and organizing, flexibility, adaptability, hard work, commitment and dedication	Tymon, 2013
Five categories: personal qualities, core skills, process skills, initiative and enterprise skills, positive attitude	Fulgene, 2016
Core skills to facilitate the work- education transition	Wimalasiri, 2015
Personal attributes	Wilson et al., 2015
Ten categories: communication, problem solving, team work, learning mindset, creativity, leadership, strategic thinking, customer service, innovation and risk management	Szilard et al., 2018
Seven categories of core skills: technical, information management, communication, collaboration, creativity, critical thinking, and problem solving	Van Laar et al., 2017
Core skills: communication skills, problem solving, technological, team working, and management skills	Klimas & Wojcik, 2018
Technological capabilities	Suleman, 2018
Organizational adaptability	Succi & Canovi, 2019
Three categories: core employability skills, communication skills and professional skills	Khurram & Bazan, 2021
Three categories: communication, critical thinking and team work	Rahman et al., 2021