Job Based Curriculum Development

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Abstract— An effective and comprehensive curriculum should reflect the philosophy, aims, objectives, learning experiences, instructional resources, and assessments that are aligned with the government education philosophy and, most significantly, fit the job or position needs in the industries. To construct the job-based curriculum model, an examination of the job specification (JS) and job description (JD) from job advertisements are crucial to analyze the skills, knowledge, talents, and other competencies required by the industries or employers. Higher education institutions (HEIs) should determine the skills, knowledge, abilities and other attributes (SKAOs) that are necessary for various professions and industries to ensure that the curriculum is dependable and up to date in order to increase the graduate marketability index. It is to ensure that graduates are prepared for the workforce. The employability skills, knowledge, abilities and competencies should be firmly entrenched in the curriculum. These are often outlined in the JD and JS as a result of the job analysis (JA).

Keywords—curriculum development, job description, job specification, job analysis, SKAOs, job postings

I. INTRODUCTION

I The goal of a good educational program is to provide a curriculum that is accurate, relevant, comprehensive and satisfies industry standards for job ready skills, knowledge, abilities, and other competencies. Therefore, it is crucial to regularly examine, revise, and change the curriculum development on a regular basis in order to maintain it according to the current need and to ensure reliability. It is important for all stakeholders, especially employers, to participate in the curriculum development because it is a challenging endeavor that affects the labor market and various businesses. It's critical to collect their requirements to learn what kind of candidates they're looking for to fill unfilled positions in the market and it is imperative to get their feedback on the types of applicants, levels of knowledge, and other competencies they seek in terms of knowledge, skills and abilities.

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II. THE IMPORTANCE OF JOB ANALYSIS IN THE HUMAN RESOURCE MANAGEMENT PERSPECTIVES

Job analysis is one aspect of Human Resources Management (HRM) functions. Other HRM functions like Human Resource Planning, Recruitment and Selection, Performance Management, Compensation Management, and so on are built on top of it. The most significant activity in determining the tasks, obligations, duties and responsibilities of a certain position in an organization is job analysis. It is used to recruit and select different types of applicants for a job (Prien, D., & Jeanette Goodstein and Louis G. Gamble, 2009)

A job analysis (JA) is used to determine the skills, knowledge, talents, and other competencies required for a position and to select the best candidates. A job analysis is a technique, and the job description and specification are the outcomes of that technique. A job analysis, to put it simply, is a strategy for acquiring and analyzing information on a certain job. (Prien et al., 2009).

The job analysis is a systematic process for gathering, documenting, and analyzing the job-related data. It includes a description of the context and principal duties of the job, including duties and responsibilities and working conditions, and the knowledge, skills, abilities, and other competencies required to perform the job. Thus, a job analysis is a combination of multiple methods or techniques. It is a formal and structured process. The job analysis process and outcomes support several Human Resource (HR) activities such as the recruitment and selection, training and development, performance management, job evaluation, among several others. These activities focus on identifying a match between a person and a job that rely on accurate information produced by job analysis. Job analysis is a significant procedure to assess the goodness of fit between people and jobs. It provides information about both the job requirements and the knowledge, skills, abilities and other competencies (SKAOs) needed to do the job. The job analysis

results are used in the final decision making for each of the HR activities specifically for the employee recruitment and selection, in specifying the requirements of the job that are subsequently used to establish employee selection procedures.

The job analysis' outcomes; the job specification (JS) and job description (JD), are used in job advertisements to explain the knowledge, skills, talents, and other competencies of successful candidates. These documents contain the precise job requirements and provide accurate and extensive information for recruiting the best-fit applicant to complete the job tasks successfully. It outlines the employers' perspectives and needs for the types of applicants who will be able to perform the job duties and obligations. From the employer's standpoint, it means that the industry's labor requirements are specific to the type of labor required by the business. The JD and JS provide job-specific skills, knowledge, abilities, talents and competencies needed for a particular job.

The JA is the collection of data on (a) job-oriented' behavior, such as job tasks and responsibilities and work standard procedures; (b) worker-oriented behavior, such as decision making, supervision, and information processing; (c) work-related behaviors, such as operating machines, materials, and tools; (d) performance standards, such as productivity and error rates; and (e) job context, such as the working environment. It is a systematic collection of data on the observable job behaviors of employees performing for a certain job, the standard of performance behaviors, and the technologies required to do so, as well as the work environment in which people perform the job. The job analysis is linked to the essential work behavior(s) for success and their relative importance. There is a strong correlation between work behavior(s) and the tasks that are associated with them. It serves as a guideline for candidate selection since employers must understand the work activities involved in each job vacancy in some depth, as well as the knowledge, skills, talents, and competencies required to successfully fill that job. These job descriptions need to be revised and rebuilt, particularly for jobs that are deemed crucial and jobs change over time. Many occupational skills could be identified through a job analysis (Reiter-Palmer et al., 2006).

The JD is a written description of what the job incumbents are required to do, how they are supposed to do the job, and the rationale for any required job procedures. It contains a summary of job analysis data. JD specifies what the job holder is expected to do, how they must do it, and the rationale for required job procedures. It serves to guide the goals and job-related activities, tasks and responsibilities of the job holder. The JD specifies what job occupants are required to do, how they are supposed to do it, and the rationale for any required job procedures.

In addition, a JS (J. Kemp Ellington, 2015) is a written description of the human attributes required for successful job performance, including educational level, work experience, personality traits and talents, required skills and knowledge, and so on. A job analysis is used to generate the JS. These are primarily referring to the qualities of the job

applicant. JS data are typically found in job listings or advertising and are used in the recruitment and selection processes. Employers and recruiters look for these personal qualities. The JS can also be used to identify gaps in knowledge, skills, abilities, and competences in order to better train and develop personnel.

The JS states the SKAOs that are required to perform the job successfully. These data also include the compensable factors that are used to perform the job evaluation, such as analytical abilities, physical exertion, accountability for budgets, and working environments. Job specification also specifies the knowledge, skills, abilities, and other attributes or competencies that are needed by a job incumbent to perform well on the job. (Catano et al., 2010).

Thus, the JA is the first step in identifying job tasks and duties as well as the KSAOs needed to carry out those duties for a particular job position. It is the process of collecting and analyzing information about a job, including data on job duties, responsibilities, and context, as well as competencies and characteristics of the job.

The following (Figure 1) depicts an overview diagram of JA Process and Outcomes associates to the SKAOs data which specifies the components of the JD and JS. The outcome data is utilized for all aspects of the Human Resource Management functions, specifically the recruitment and selection in hiring and determining the right candidate for the job.

An overview diagram of the Job Analysis Process and Outcomes linked to the SKAOs data, which details the elements of the JD and JS, is shown in the following (Figure 1). The outcome data is used for all facets of HRM, but particularly for hiring and choosing the best candidate for the position throughout the recruitment and selection process.
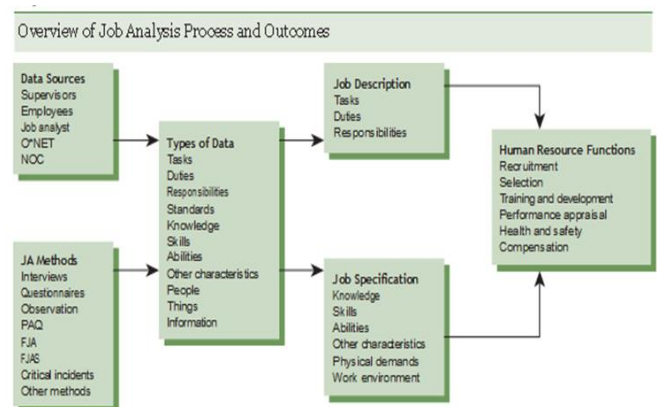

Figure 1: JA Process and Outcomes associates to the SKAOs data

Source: KELLOWAY/CATANO/DAY. *People and Work in Canada, 1E.* © 2011 Nelson Education Ltd. Reproduced by permission. www.cengage.com/ permissions

As a result of the JD and JS, the outcomes of the job analysis give employers and recruiters a comprehensive image of the job activities and personal characteristics of applicants. Employers conduct job analyses to determine whether different tasks require different levels of effort or involve different working environments, as well as to adjust pay scales based on the job applicant's attributes - a quality or feature that is regarded as a characteristic or inherent part of an individual job applicant (J. Kemp Ellington, M. T., 2015).

III. WHAT ARE SKAOS?

According to Gatewood and Barrick (2011), the following knowledge, skills, and abilities are described in relation to employee requirements for a job:
Knowledge is the fact or condition of being aware of something with familiarity earned by experience or association. It can also refer to a collection of facts or instructions that are required to do a task properly.

Skill: The degree of competence or expertise with which a person does a specific task. Numbers are widely used to describe competency levels. an acquired ability to do something competently, dexterity of coordination in the execution or performance, and a developed aptitude or competence in language abilities.

When starting an activity, a person has an ability—a more all-encompassing, long-lasting characteristic or capability. It is the condition or state of having the capacity to do something on a physical, mental, or legal level; aptitude for the arts.

The "O" in KSAO stands for "other attributes," which refers to personal qualities like personality that are essential for performing a job well. A person's age, sex, or race may be mentioned in the job description along with additional physical qualifications or other characteristics.

Boyatzis (2008) popularized the term "competency" as a combination of a motive, trait, skill, aspect of one's self-image or social role, or a body of relevant knowledge. Competencies are also defined as groups of related behaviors needed for successful job performance in an organization. Competencies are then used to identify the SKAOs that distinguish the performances, especially the high performers.

IV. THE JOB POSTINGS

Explicit work standards and job descriptions are provided by industries, organizations, and employers or recruiters in order to specify the best set of requirements for a given job and to identify the best-suited persons to meet those needs. Analyzing job requirements in the job description and job specification may assist the higher education provider in determining the optimal abilities, knowledge, talents, and other competencies for each position.

The data gathered from the JD and JS can be utilized to create curriculum for a wide range of jobs. In order to describe the most specific criteria for a certain position and discover the best-suited persons to satisfy those expectations, industries and employers publish thorough descriptions of their employment needs. The curriculum developer may be able to discover the optimal abilities, knowledge, talents, and other competences for each role by analyzing job criteria in the job description and job specification document. Finally, the information obtained from the JD and JS can be used to construct curriculum for a variety of jobs.

There is a limited study on the exploration of the recent job requirements sought by the employers in relation to the tasks in which the applicants/job seekers as well as the graduates are expected to perform on the job. Even though the Malaysian Educational Blueprint provides competency sets for the HEIs based on a certain field of studies or professions, the employer requirements may be different and present more up to date skill requirements and it is useful for the curriculum renewal (Broome & Gillen, 2014). Most employers' job competency requirements established for the online job postings are more reliable than relying on the competencies described in the literature and from professional bodies (Reeves & Hahn, 2012; Cramer & Tenzek, 2013).

It has been observed that the abilities required to obtain a job appear to be distinct from those required once a job has been obtained (Semeijn et al., 2006; Messum et al., 2016). According to Bennett (2002), job advertising accurately reflects the skills and attributes that employers seek since the job competency requirements specified in the advertisements are carefully studied and assessed to suit the positions once the job analysis is completed. Current industry skill requirements can be found in job advertisements, which can help inform curriculum development. Current and future graduates can use it to compare and analyze their competency gaps.

V. THE APPLICATION OF THE JOB ANALYSIS(JA)

The candidate or job applicant selection accounts for most job analyses. Employers or recruiters need to establish the work activities details involved in each job vacancy and most importantly, the knowledge, skills, abilities, and the competencies required to fill that job successfully. According to (Reiter-Palmer et al., 2006), it is important to recognize that many skills are specific to a given occupation and that these occupationally specific skills can only be identified by a job analysis.

The JA are the basis for developing behavioral interviewing protocols for candidate screening. This is to establish the degree to which the candidates or job seekers have the necessary requirements to perform the important work activities. Another important aspect of job analysis is considered as the criteria for validity of any pre-employment selection procedure, especially psychological tests and personality tests. The most popular personality tests are the Myers-Briggs test, Big Five test, 16Personalities, Predictive Index (PI) Behavioural Assessment and Keirsey Temperament Sorter (JobStreet.com).

The most recent studies conducted are on the identification of high demand areas of practice within professions (Wise et al., 2011; Broome & Gillen, 2014), the most in demand skills by

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employers across all job types where a comparison is made with the contents of online job postings to identify the skill gaps (Workopolis, 2014), analyzed the ideal employee across all jobs by examining the national newspaper advertisements for the last three decades (Kuokkanen et al., 2013) and constructed the ideal manager profile based on the online job advertisements source (Varje et., 2013).

As a result, analyzing data from online job advertisements can be regarded as a reliable and substantial source for determining the skills, knowledge, abilities, and other competencies that employers or recruiters need. The gaps (skills, knowledge, abilities, and other competencies) provide a dependable source of data for assessing and diagnosing, as well as updating and upgrading curriculum creation to suit industry employment needs (Wellman, 2010; Messum et al., 2011; Reeves & Hahn, 2012; Broome & Gillen, 2014).

The competency sets exist for many professions and employer requirements may differ and the online job postings source present more up to date skill requirements useful for curriculum renewal (Broome & Gillen, 2014). The findings have been supported by other studies associated with the implications for curriculum development (Lavy & Yadin, 2013; Emery et al., 2012; France, 2010; Kennan et al., 2009; Arcodia & Barker, 2003).

VI. THE SCHEMATIC FRAMEWORK OF THE JOB ANALYSIS AND CURRICULUM DEVELOPMENT

The information obtained from the JD and JS can be used to develop curriculum for a variety of jobs. Industries and employers publish extensive descriptions of their employment needs in order to specify the most exact requirements for a particular position and identify the most qualified individuals to meet those expectations. By examining job requirements in the job description and job specification, the curriculum developer may be able to identify the relevant skills, knowledge, abilities and other competencies required for each job. Finally, curriculum can be created using the knowledge from the JD and JS for a number of jobs.
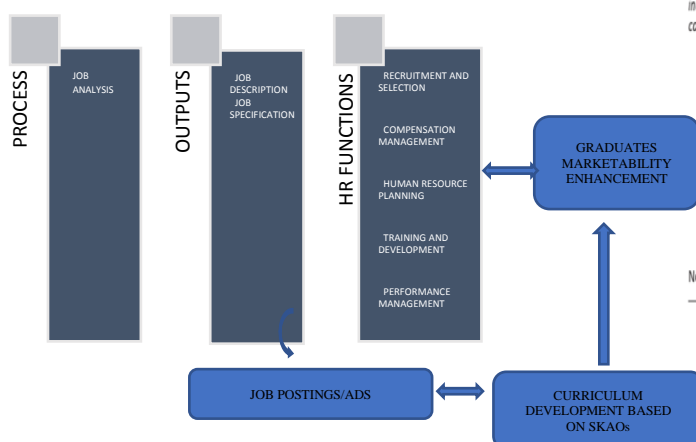

Figure 2: The Framework of Job Analysis and Curriculum Development

The creation of a thorough, trustworthy job-based curriculum framework could help HEIs identify the SKAOs needed by the labour market. Thus, the HEIs could develop the practical and dependable Job Based Curriculum and relevant courses, Program Learning Outcomes (PLOs), Course Learning Outcomes (CLOs) and assessments as well as determine the pertinent pedagogical and andragogical perspectives for the programs being offered.

To further justify the relevance, practices and acceptance of the proposed job based curriculum framework, a comprehensive analysis of the other empirical studies is crucial. A significant study was carried out by Varje & Vaananen (2013) on the historical development of psychological management in Finnish working life from the perspective of the hiring process, focusing on the changing characteristics of the ideal manager in Finland Between 1949 and 2009. They found out that, the average number of references to personal characteristics and talents in job advertisements for management positions increased from 0.7 to 3.8, and this number had surpassed the average number of references to technical and cognitive abilities. The study had undertaken a thorough examination of 1,305 job postings for managerial positions published between 1949 and 2009 in the influential Finnish newspaper Helsingin Sanomat. The findings concluded that over a number of decades, Finnish organizations gradually produced a very multifaceted ideal manager in 2009. The outputs of the job advertisements indicate the subjective expectations of a potential candidate in the perspectives of employers. They categorized some of the crucial skills needed for an ideal manager. The following Table 1 specifies the job-related skills needed to perform the tasks for the managerial positions. It illustrates the average number of personal skills and traits per job advertisement.

Table 1: Skill categories and the specific skills included in the categories

Skill category	Social and emotional skills	Integration and concentration	Paternalistic leadership	Social, emotional, flexible and adaptable leadership	Results and development orientation	Technical and cognitive skills
Specific skills included in the category	Ability to work with others; Customer service skills; Human relations skills; Openness; Outgoing character; Friendliness; Supportiveness; Sensitiveness; Positive attitude	Sense of responsibility; Tolerance of pressure; Initiative; Ability to inspire others	Leadership talent; Independence; Honesty; Temperance; Good behavior	Social and emotional skills[a]; Flexibility; Adaptability	Tough-minded; Assertive; Determined; Goal-oriented; Challenge-oriented; Results-driven; Creative; Innovative; Development-oriented; Self-development-oriented	Education; Experience; Knowledge of the trade; Specific know-how; Language skills

Note: [a]Same skills as in the category of social and emotional skills

Source : Varje & Vaananen (2013)

The HEIs should be concerned with these competencies in order to provide graduates with the necessary teaching and learning activities to meet industrial demands. These abilities could be translated into the appropriate evaluations and instructional materials to guarantee that the PLOs and CLOs are met.

A study by Ferns & Lily (2015) supports the relevance of the work integrated learning in a way how the job is carried out at the workplace. They suggested that authentic learning experiences that replicate workplace settings are crucial elements for the students to experience the real job environments for maximizing the graduate employability outcomes. The application of Work Integrated Learning (WIL) reinforces the development of actual attributes and competencies needed to perform a job successfully. In addition, the WIL could prepare the graduates towards the uncertainty of the job market. Thus, the conceptualization of curriculum development and assessment strategies of job tasks are required in order to address these job demands. The HEIs roles are to increase the employability capabilities by integrating the SKAOs in the curriculum development which would lead to the work-ready graduates. In this perspective students or graduates are able to stimulate learning experiences through the application of theoretical concepts in real-world settings. Bridging the skill development across the curriculum is fundamental to a work-related curriculum design. The implementation of a practice-based curriculum increases the development of professional practices as the integral component of the HEIs program. The WIL enhances the teaching and learning activities and strategies to achieve the strategic educational goals in establishing a comprehensive workable institutional curriculum framework.

The supporting empirical studies was conducted on the public health professions core set of informatics skills by integrating informatics competencies and job analysis to develop an evidence-based curriculum framework (Joshi et al., 2021). In this research, the content analysis of the Population Health Informatics related job postings in the state of New York between June and July 2019 was analyzed. The initial search yielded 496 job postings. The information recorded from the publicly available job postings focused on the job categories, educational level required, work experience preferred, salary information, job types and locations, and other competencies associated with knowledge, skills, expertise and software skills. The findings revealed that the most common job titles are analyst, job types are mostly full-time jobs and nearly half of these jobs were in New York City. It has further revealed that the requirements of working in a multidisciplinary team and possessing biomedical/clinical experiences are commonly required by the employers or recruiters. The study has also concluded that the structured query language (SQL), Python, and R language are common programming language skills needed by the public health organizations. The data is used in developing the curriculum framework for the public health professions. It is reliable to identify the SKAOs needed and applied in constructing or updating the public health PLOs and types of assessment for the programmes offered. Thus, job posting data is crucial to analyze and examine in ensuring all the SKAOs are relevant and updated to meet the industry requirements of the job changing market (Joshi et al., 2021).

The case study approach was carried out by Dixon & Jovanovska (2022) to identify the competencies that are common across entities in the leisure and hospitality industry operation in North Central Idaho. The experience of front-line workers is crucial to the leisure and hospitality industries' ability to deliver good services and is seen as one of the key elements in achieving a high level of customer satisfaction. The workers in the leisure and hospitality industry were asked to list the responsibilities, tasks, general knowledge, talents, and dispositions of a guest relations agent. The directory of essential job duties was constructed. The duties and tasks data are then used as the content for the development of a curriculum to train guest relations agents by the regional technical college and companies. The specific competencies are integrated with the Career and Technical Education (CTE) curriculum. This integration ensures that students acquire the entry-level skills that are specific and compatible to the leisure and hospitality industry in the region. The competency profile generated is the first step taken in the Systematic Curriculum and Instructional Development process. The identification of tasks outlines the general knowledge, skills, and attitude that are required to complete each task proficiently. Then, the information of relevant competencies is embedded in the high school, and technical college curriculum. In addition, the employers utilize the competency profiles to generate content for the professional development of their workers. It has further proven the data gathered from the job advertisements are comprehensively used in the curriculum and professional development in the industries. By providing and equipping graduates with relevant SKAOs, it helps employers reduce the cost of hiring and selection as well as the training and development activities and increases the employability level of graduates.

The supportive research findings by Messum et al., 2016) further justified that nearly half the studies used online job recruitment sites rather than professional publications, or employer websites. More recently research done has concluded that web-based sites appear to be the major source of job vacancies (Omar et al., 2012; Emery et al., 2012). Research done by Messum et al., 2016) revealed that nearly half of the studies employed online job recruiting sites rather than professional magazines or company websites to conduct their study. According to a more recent study, web-based sites appear to be the primary source of job openings (Omar et al., 2012; Emery et al., 2012). In addition, the most commonly identified employability skills are communication skills followed by teamwork, job specific skills and experience (Messum et al., 2016).

Another essential employability skill, according to the research, is experience (Orme, 2008). One-quarter of advertisements required experience, which was specified in 67 percent of advertisements (Chao & Shih, 2005), and it is a necessity for new entry-level positions (Messum et al., 2011; Reeves & Hahn, 2012). This finding may help to explain the recruitment shortages identified by Graduate Careers Australia (GCA) (2015), and it has important implications for Higher Learning Institution providers who want to

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incorporate work-based exposure into the learning process, which could be accomplished by rethinking internship and apprentice arrangements.

Table 2 : Rank Order of Employability Skills (ESs) found in Advertisements

Findings	N	%	Article number in Table 1
Communication skills	25	62.5	1, 4-8,10, 12,13,15,18, 19, 22-27,30-32, 35, 36, 38
Teamwork	13	32.5	4, 6, 15,18,19, 22, 26, 27, 30, 36-38, 40
Job specific or technical skills	10	25.0	6, 12,16,18-20, 31, 32, 37, 39,
Experience	10	25.0	3, 6,10,15,16,19, 22, 24, 26, 28
Interpersonal skills	9	22.5	2, 6,11,13,15, 23, 30, 35, 39
Organisational skills, planning	7	17.5	4, 5, 8, 19, 24, 38, 40
IT, computing, software skills**	7	17.5	4, 6, 12,19, 22, 27, 38
Tertiary qualifications	7	17.0	3,15,16,18, 22, 31,37
Leadership	3	7.5	8,18,29
Personal qualities	3	7.5	1, 27,34
Creativity and innovation	3	7.5	1,19, 25
Analytical skills	3	7.5	8,18,22
Problem solving	2	5.0	12,38
Project management	2	5.0	8,18
Work independently	2	5.0	20,40
Other eg good fit, commitment, drive change, ethical, service orientation, LLL, time management, collaboration skills	6	15.0	23, 25, 26, 35, 36, 38

N= Number *More than one could be reported. ** IT skills for IT industry are listed as job specific skills.

Source : Messum et al., 2011

Based on the above empirical studies, it's critical to identify and evaluate the online job postings criteria provided in the job description and job specification to assess the employers' job requirements because it gives trustworthy information for developing curriculum to fill in the gaps. A thorough examination of job posting data would aid in detecting current demands for specific job competencies, allowing HEIs to improve their graduates' marketability index. The benefits of evaluating job advertisements include enormous data sets at a reasonable cost and the most up-to-date information on jobs and their prerequisites. It delivers extensive information about employability abilities not just to curriculum writers but also to graduates. Generally, the online job postings data provide insight into employment opportunities, types of jobs available in terms of skill sets, knowledge and competency requirements of industry, locations, remunerations and other job-related requirements.

VII. CONCLUSION

Job Analysis is a primary tool to collect job-related data. It provides information to organizations that help them determine the best fit candidates or graduates for the specific jobs. The outcomes of job analysis are key influences in designing learning, developing performance interventions, and improving the employee's job performance in most organizations. The data is used to perform the human resource planning, training and development programmes,

recruitment and selections and performance management system. Utilizing the data, the ideal candidate for the position is precisely identified. This aids businesses or organizations in appointing the ideal candidates to the appropriate positions. A well-suited candidate for the position can carry out their tasks and responsibilities with efficiency and makes a major contribution to the company. Candidates who are poorly matched to the position may find the work demanding or face difficulty in adjusting to the workplace. In order to ensure a high level of person-job matching, it is necessary to align job fit requirements with graduates SKAOs.

The duties and responsibilities of a specific job or position offer trustworthy content for the creation of the curriculum. The integration of job tasks in the educational curriculum helps to ensure that students or graduates acquire the relevant job entry-level requirements. The potential enormous data sets that may be used to identify the SKAOs needed for a post are readily accessible through the job advertisements. For creating educational curriculum based on the viewpoints of companies and industrial demands, the JD and JS provide a plethora of relevant information. In order to handle the swift change in jobs in the labor markets, curriculum development should be viewed as a continual process to accommodate the quick shift in jobs in the labor market. Labor market issues and perspectives need to be embraced so that the HEIs could construct the curriculum to fulfill the requirements of the industry, and be flexible and adaptable to the changes in the labor market.

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