A HIERARCHICAL LINEAR MODEL OF ALUMNI SURVEY ON INDIVIDUAL COMPETENCY, INSTITUTIONAL SERVICE, AND JOB SATISFACTION IN A CASE UNIVERSITY IN TAIWAN

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ABSTRACT

Alumni surveys are important tools for detecting students' problems, trends in learning outcomes, and planning for students' common competencies for their careers. Feedback on the alumni's employment status, job satisfaction, and gathering insights for institutional quality improvements are some of the major objectives of alumni surveys. A variety of factors at individual and organizational levels exert influences on students' job satisfaction. Through the 'Hierarchical Linear Model' (HLM), one can detect these influences at multiple levels. In the present study, an alumni survey was analyzed. Factors related to individual competency were professional skill, information technology application, communication and teamwork, and learning autonomy. Factors at the organizational level were related to institutional services, such as teachers, equipment facilities, administration, reputation, and service-learning. The study analyzed 4,931 individuals and 88 groups in the survey on undergraduates' alumni feedback questionnaires after their graduation during four academic years. The basic statistics, correlation, and HLM analysis were carried out. The results demonstrate that individual factors and institution variables are positively related. The 'teacher' and 'administration' had a positive relation to alumni's job satisfaction. The institution's service-learning training had a significantly positive moderated effect with information technology application and learning autonomy on their job satisfaction.

Keywords: Alumni survey, Individual competency. Institutional service, Job satisfaction, Hierarchical linear model

Introduction

Alumni surveys are important tools for university management in detecting students' problems, trends in learning outcomes, and policy formulations for students' careers. Feedback on alumni's preferences, current employment status, experiences, and satisfaction with all areas of their education from academic (quality of professors and departments) to student life (campus life, extracurricular activities, technology resources) are some of the major objectives of alumni surveys. Such surveys provide important insights into the institution's quality improvement. Lüer and Aebi (2017) stated that continuous and repeated alumni surveys help in detecting students' needs, problems, and learning trends and outcomes for further policy formulation. Meaningful advice from employers, professionals, and recent graduates and their industry experiences could help policymakers make graduates' capabilities more meaningful (de St Jorre & Oliver, 2018). In 2014, Taiwan's Ministry of Education (MOE) initiated a project on alumni surveys. The main purpose of alumni surveys was to improve Taiwan's higher education system to produce talents required by the industries. MOE assessed alumni' career paths, career situations, and learning items (their part-time or full-time work status, career choices, how long it took them to find the first job, their needs, and perceived gaps between their training and current work, competency acquisition, work locations, job satisfaction, and congruence). A high level of alumni's dissatisfaction at workplaces warrants a helping hand by the alma mater and a revisit to graduates' training strategies.

Among all learning items in the MOE survey, findings regarding job satisfaction are worth further attention and evaluation, as these are directly related to the individual's competency (Agrawal et al., 2019). A variety of individual and organizational factors influence job satisfaction (Austin & Gamson, 1983). Herzberg (1966) identified 14 important factors that affect job satisfaction: achievement, recognition, the work itself, responsibility, possibility of advancement, possibility of growth, salary, job security, interpersonal relations, technical supervision, agreement with company policies, administration, work conditions, personal life, personal skills, welfare in working places, and educational support in universities. Many researchers used the regression method to detect the influential factor and job satisfaction at workplaces (Fassoulis & Alexopoulos, 2015; Lu et al., 2016; Villar-Rubio et al., 2015; Yildirim et al., 2016). However, the inter-factorial effects among individual and organizational factors are difficult to comprehend by the simple regression model. Standard statistical tests rely heavily on the assumption of independence of the observations, but the individual observations at the same institution are, in general, not independent. Hence, a more suitable multilevel method, the 'Hierarchical Linear Model' (HLM), should be adopted to analyze the data.

In the HLM method, individuals and groups are conceptualized as a hierarchical system of individuals nested within groups, with individuals and groups defined at different levels (Hox et al., 2018). The advantage of HLM is that it can deal with problems at multiple levels and can support more parameters estimation models in the same school for researchers (Hofmann, 1997; Woltman et al., 2012). There are educational research applications, where pupils are nested

within schools, family studies with children nested within families, medical research with patients nested within hospitals, and biological research with teeth nested within different persons' mouths (Hox, 1998). In the HLM, it is necessary to design the research from top to bottom and explore the main effect and the moderated effect from the organizational perspective. Hence, the HLM was used in the present study to detect the multilevel effects in the alumni survey. From the existing database collected by the Ministry of Education (MOE), Taiwan, the management in the case university wanted to understand the relationship among graduates' competency, organizational role, and job satisfaction. This can help the university administration understand the factors that may affect students' careers and take corrective measures while graduates are still on the campus and before their graduation.

In this study, students are nested within various departments at the case university. Therefore, the departments have been considered as 'group level' in the multilevel system. Although alumni belonged to different academic years, questions related to job satisfaction were the same. It is based on the concept that repeated measures; data collected at different intervals and under different conditions are nested within each participant (Raudenbush & Bryk, 2002; Osborne, 2000). Therefore, alumni of the case university were clustered into the group level by various departments and academic years at the same time. The total number of groups (N=88) fulfilled the minimum number requirement (N=30) in the HLM analysis. The questionnaire items were the same during different academic years, and the participants come from the same university, so the data fits the dependent rule in the HLM hypothesis.

In Figure 1, alumni are considered at the individual level, while the groups as the organization level. In the MOE alumni survey design, the individual competency included professional skill, information technology application, communication and teamwork, and learning autonomy. The group factors of institutional service included teacher, equipment facilities, administration, institution's reputation, and service-learning. Through HLM, the main and moderated effects have been analyzed and discussed.

The objectives of the present study are: (1) to diagnose the outcome of individual competencies and institutional service, (2) to evaluate the correlation among scores of individual and organizational factors (3) to find the main and moderated effects between individual and organizational levels through HLM analysis. It is hoped that by this analysis, some meaningful indicators would emerge that may help the university management in the planning of students' career paths.
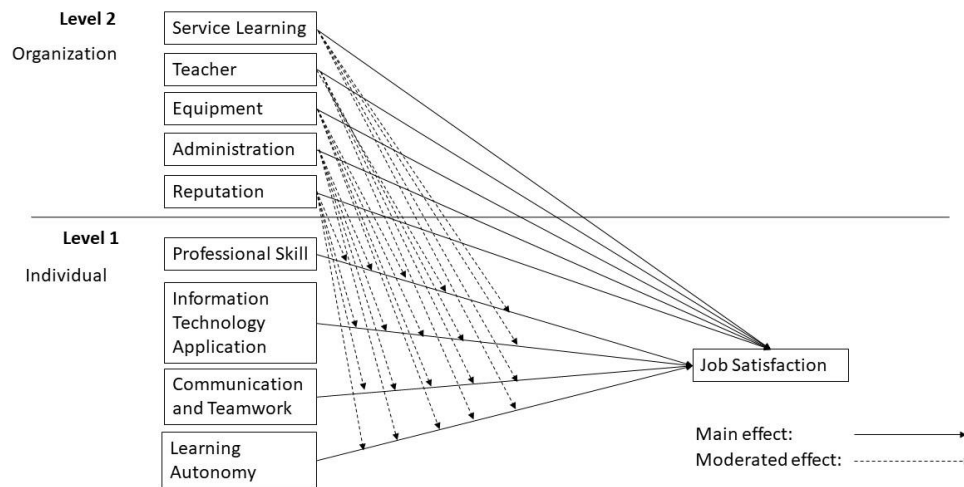
Level 2
Organization

Service Learning

Teacher

Equipment

Administration

Reputation

Level 1
Individual

Professional Skill

Information Technology Application

Communication and Teamwork

Learning Autonomy

Job Satisfaction

Main effect:
Moderated effect:

Figure 1: HLM Models

Literature Review

Individual Competency and Job Satisfaction

Spencer and Spencer (1993) defined competency as 'an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation.' In the literature on human resource management, competency is defined as "a set of observable performance dimensions, including individual knowledge, skills, attitudes, and behaviors, as well as collective team process, and organizational capabilities that are linked to high performance and provide the organization with sustainable competitive advantage" (Athey & Orth, 1999). Jung and Shin (2015) identified five key competencies for the university's administrative staff: organizational understanding, problem-solving, interpersonal, informational, and global competency. Also, competency is a combination of attitude, behavior, knowledge, and skill that contribute to an individual's needs and success (Mah & Ifenthaler, 2017; McCall & Flyers, 1998). In Taiwan, undergraduates and graduates are the primary labor force; therefore, many higher education institutions pay attention to alumni feedback to improve their competencies and competitiveness (Agrawal et al., 2021). MOE's alumni survey contains four common competencies: professional skill, information technology application, communication and teamwork, and learning autonomy. Several previous studies have found that competency positively relates to job satisfaction (Campion et al., 2011; Chao, 2016; Lee et al., 2015; Sani et al., 2016). However, Jung and Shin (2015) in Korea found that interpersonal skills affect overall job satisfaction. Therefore, in this paper, common competency is detected to understand alumni's job satisfaction in the case of a university in Taiwan.

Institutional Service and Alumni's Job Satisfaction

Besides individual competency, an institution also plays an important role in alumni's job satisfaction (Ratanavaraha et al., 2016; Schmalbach & Quesada Ibargüen, 2011). According to Seng and Ling (2013), institutional service includes instructors, curriculums, learning resources, and student engagement dimensions, while learning resources include administrative support and advanced equipment facilities. It has been found that graduates' personal academic motivation at school, administrative support, and program satisfaction are positively related to the institution's reputation (Blau et al., 2016; Blau, 2019; Elsharnouby, 2015; Munisamy et al., 2014). In addition, labor education and service-learning promote graduates' team and good citizenship spirit, enhance their public service attitude, leadership, volunteer spirit, and employability skills (Busch, 2018; Hardin-Ramanan et al., 2018; Holmes et al., 2021; Seider et al., 2011). Therefore, in the present study, the intuitional factors were analyzed to find the correlation and moderated effects on individual factors.

HLM Theory and Application

In the multilevel regression model, we have data in J groups and a different number of individuals Nj in each group. On the individual level (level one), we have the dependent variable Yij and the explanatory variable Xij, and on the group level (level two), we have the explanatory variable Zj. Thus, we have a separate regression equation in each group similar to Hox (1998):

$$Yij = b0j + b1j \, Xij + eij. \tag{1}$$

The bj are modeled by explanatory variables at the group level:

$$b0j = r00 + r01 \, Zj + u0j, \tag{2}$$

$$b1j = r10 + r11 \, Zj + u1j. \tag{3}$$

Substitution of (2) and (3) in (1) gives:

$$Yij = r00 + r10 \, Xij + r01 \, Zj + r11 \, ZjXij + u1j \, Xij + u0j + eij \tag{4}$$

There are regression analyses, moderated effect, and residual tolerance in the HLM equation (4).

The hierarchically structured data analysis, based on appropriate statistical models, has application in several research areas. In the education field, most of the HLM studies are at two levels – (i) students and (ii) institutions (Atas & Karadag, 2017; Bowers & Urick, 2011; Valente & Oliveira, 2009). However, considering satisfaction as another factor, HLM analysis has been carried out (Kim & La, 2018; Eason et al., 2018). In a separate study, Zhang et al. (2018) demonstrated a multilevel moderated effect between students and school. Therefore, in the present research, the institution's role (factors) was analyzed through HLM analysis to understand its alumni competency effects.

Methodology

Participants and Procedure

The case university in the present study follows the Ministry of Education's higher education guidelines in Taiwan. In this study, the secondary data was used to extract the information from the MOE's alumni's survey database, mainly to understand the employment status and job satisfaction of students who graduated from 22 departments in five colleges (Management, Informatics, Humanities, and Social Sciences, Design, and Science and Engineering) during four academic years (2015 to 2018) in the case university.

The alumni from 2015 to 2018 were invited to participate in the survey. Finally, 4931 members answered the questionnaires and were used as the sampling pool. The survey report's data analysis was based on the case university's common topics and was coordinated by the students' affairs office's student development center. The survey data was used only for research purposes and with no business motive. The participants were unaware of the hypotheses, and the questionnaire did not include the participants' details, with their names kept anonymous. Therefore, a strict ethical procedure was followed as per the exemption regulations of the Institutional Review Board (IRB) review in the Ministry of Health and Welfare, Taiwan. All data were stored securely, with access limited to the researchers.

Measures and Research Design

In this study, the data was analyzed through basic statistics, correlation, and HLM analysis. About the inferential test of the correlation analysis, the variables between the individual competency and organization's service could evaluate their positive or negative effects among the samples. To explain and avoid the collinearity and the main effect estimation error, the independent variables between individual and organizational levels were necessary to transfer to new numbers in the HLM analysis. The level one factors were assigned into cluster mean centers. The level two factors were computed into grand mean centers. From the fixed effect estimation and the moderated effect of HLM, the dependent factor of job satisfaction could be evaluated correctly.

There are 4,931 records in the undergraduates' alumni feedback questionnaires from 22 departments for four academic years from 2015 to 2018. The groups are clustered into 88 groups from total alumni (Level-2 N=88). There are over 15 individual records in each group. It fits the samples of Hox (1998) 50/20 to 100/10. The resulting data sets comprised 4931 members of 88 groups. The average number of participants per group was 44 (SD=26.72), ranging from 19 to 125. Groups were studied in the field of Management (43.3%), Informatics (13.9%), Humanities and Social Sciences (17.3%), Design (12.9%), or Science and Engineering (12.5%).

To illustrate how models were developed and tested using HLM, all the analyses were performed using HLM software version 6, which is available for download online (Raudenbush et al., 2006). Besides the cross-analysis of moderated effect, the mixed linear models were carried out

through SPSS 22. The level one factors were transferred into cluster mean centers, and the level two factors were computed into grand mean centers. From the fixed effect estimation, the moderated effect was evaluated.

Control Variables

The questionnaire items included the students' four core competencies, feedback on labor education, employment counseling measures, and suggestions to the university. From the learning experience in the case university, there are two items in the survey. One is the individual competency, and the other is the satisfaction of the organization's service (institutional role).

At individual (Level 1), the inputs were professional skill (PS), information technology application (IT), communication & teamwork (CT), learning autonomy (LA). In organization variables (Level 2), the inputs were a teacher (T), equipment (E), administration (A), reputation (R), and service-learning (S). The competency included four items (Cronbach's α values=.92). The institutional group service included five items (Cronbach's α values=.94). It meant that the reliability was good enough. Participants' ratings were based on 5-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree). Through HLM analysis, the output (Job Satisfaction) could evaluate the main and moderated effects of Level 1 and Level 2 inputs.

Results

Basic Statistics and Correlation Analysis

Among the four items of individual competencies, the average was higher than 3.45 (Table 1). It means the alumni agreed that they have enough competency from learning on the campus. In addition, the scores of institutional service were higher than 3.40, indicating that the alumni were satisfied with the teacher and equipment facilities at the case university. To understand the relationship between individual and organizational variables, the correlation analysis was carried out first. All items are positively related. Especially the institutional factors of teacher, equipment, administration, and reputation have a strong positive correlation (the coefficient is approaching .9).

Table 1: Correlation

	M	SD	1	2	3	4	5	6	7	8	9
1. PS	**3.45**	1.02	1								
2. IT	**3.49**	1.06	.723**	1							
3. CT	**3.51**	1.13	.755**	.732**	1						
4. LA	**3.52**	1.13	.732**	.718**	.830**	1					
5. T	**3.51**	1.17	.729**	.671**	.753**	.730**	1				
6. E	**3.51**	1.17	.706**	.665**	.746**	.728**	.893**	1			
7. A	**3.47**	1.09	.678**	.639**	.706**	.700**	.843**	.855**	1		
8. R	**3.49**	1.12	.721**	.673**	.752**	.738**	**.899****	**.896****	**.893****	1	
9. S	**3.41**	1.13	.529**	.526**	.581**	.572**	.608**	.613***	.604**	.624**	1

Note: **< .01 (two-tailed test)

PS: professional skill; IT: information technology application; CT: communication & teamwork; LA: learning autonomy; T: teacher; E: equipment; A: administration; R: reputation; S: service-learning.

Aggregation Issues

Since these variables were measured at the individual level, their aggregation to the group level was required for further analyses. We, therefore, calculated intra-class correlations (ICC1) and reliability of group means (ICC2) as per the previous report (Klein & Kozlowski, 2000).

1. Random ANOVA Model

The outcome variable is satisfactory.

Level-1 Model

$$Y_{ij} = b_{0j} + e_{ij}. \text{ (b is the intercept, and e is the error term)}$$

Level-2 Model

$$b_{0j} = r_{00} + u_{0j}$$

ICC (1) =0.44/ (0.44+0.51) =0.463 (ICC>0.138 high within related) and ICC (2) =0.976. Different groups have different satisfactory. An addition, the p-value <0.05 indicates that different groups will create significant differences in job satisfaction.

2. *The Random Coefficient Regression Model*

The independent variables of level 1 are professional skill (PS), IT implication (IT), communication & teamwork (CT), and learning autonomy (LA). The summary of the model is as below.

Level-1 Model

$$Y_{ij} = b_{0j} + b_{1j}*(PS) + b_{2j}*(IT) + b_{3j}*(CT) + b_{4j}*(LA) + e_{ij}.$$

Level-2 Model

$$b_{0j} = r_{00} + u_{0j}$$

$$b_{1j} = r_{10} + u_{1j}$$

$$b_{2j} = r_{20} + u_{2j}$$

$$b_{3j} = r_{30} + u_{3j}$$

$$b_{4j} = r_{40} + u_{4j}$$

The deviation is from 10,984 to 10,497. The Variance component is from .507 to .438.

3. *Intercept Model*

To analyze the effect of institutional factors such as teacher (T), equipment (E), administration (A), reputation (R), and service-learning (S) at level 2, the intercept model is as below.

Level-1 Model

$$Y_{ij} = b_{0j} + e_{ij}.$$

Level-2 Model

$$b_{0j} = r_{00} + b_{01}*(T) + b_{02}*(E) + b_{03}*(A) + b_{04}*(R) + b_{05}*(S) + e_{ij}.$$

The deviation decreased from 10,984 to 10,977.

4. *Complete Model*

The level 1 and level 2 factors are shown in model 4.

Level-1 Model

$$Y_{ij} = b_{0j} + b_{1j}*(PS) + b_{2j}*(IT) + b_{3j}*(CT) + b_{4j}*(LA) + e_{ij}.$$

Level-2 Model

$$b_{0j} = r_{00} + b_{01}*(T) + b_{02}*(E) + b_{03}*(A) + b_{04}*(R) + b_{05}*(S) + u_{0j}$$

$$b1j = r10 + b11*(T) + b12*(E) + b13*(A) + b14*(R) + b15*(S) + u1j$$

$$b2j = r20 + b21*(T) + b22*(E) + b23*(A) + b24*(R) + b25*(S) + u2j$$

$$b3j = r30 + b31*(T) + b32*(E) + b33*(A) + b34*(R) + b35*(S) + u3j$$

$$b4j = r40 + b41*(T) + b42*(E) + b43*(A) + b44*(R) + b45*(S) + u4j$$

In order to explain and avoid the collinearity and the main effect estimation error, the level one factors were transferred into cluster mean centers (PS(C), IT(C), CT(C), and LA(C)). The level two factors were computed into grand mean centers (T(G), E(G), A(G), R(G), and S(G)).

In Table 2, T(G) and A(G) were positive to job satisfaction in the HLM analysis. The service of teachers and administration led to alumni satisfaction in the main effect estimation. Besides, the moderated effect among the professional skill (PS)* service-learning (S), IT implication (IT) * service-learning (S), and learning autonomy (LA) * service-learning (S) had a significant moderated effect on job satisfaction. The institutional training of service-learning with individual good information technology implication or learning autonomy led to reasonable job satisfaction. However, the institutional training of service-learning with individual good professional skills had lower job satisfaction.

In the complete model:

Job satisfaction=3.297-.001*PS(C)-.024 *IT(C)-.007* CT(C)-.006* LA(C)+.016* T(G)-.011* E(G)+.014* A(G)-.011* R(G)-.001* S(G)+.064* PS(C) * T(G)-.048* PS(C) * E(G)+.023* PS(C) * A(G)-.058* PS(C) * S(G)+.049* PS(C) * R(G)-.013* IT(C) * T(G)+.040* IT(C) * E(G)+.007* IT(C) * A(G)-.064* IT(C) * R(G)+.037* IT(C) * S(G)-.026* CT(C) * T(G)+.044* CT(C) * E(G)-.004* CT(C) * A(G)+.025* CT(C) * R(G)-.034* CT(C) * S(G)-.028* LA(C) * T(G)-.027* LA(C) * E(G)+.019*LA(C) * A(G)-.004* LA(C) * R(G)+.048* LA(C) * S(G)

Table 2: HLM Analysis

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	3.297	.069	88.004	47.940	.000	3.161	3.434
PS(C)	-.001	.031	82.803	-.036	.971	-.062	.060
IT(C)	-.024	.018	55.660	-1.360	.179	-.059	.011
CT(C)	-.007	.026	67.939	-.271	.787	-.058	.044
LA(C)	-.006	.025	74.432	-.261	.795	-.055	.043
T(G)	**.016**	.025	126.361	.628	.531	-.034	.065
E(G)	-.011	.023	118.669	-.478	.634	-.057	.035
A(G)	**.014**	.026	128.092	.521	.603	-.038	.066
R(G)	-.011	.029	128.125	-.394	.694	-.069	.046
S(G)	-.001	.014	52.064	-.054	.957	-.029	.027
Moderated Effect							
PS(C) * T(G)	.064	.033	4261.440	1.921	.055	-.001	.129
PS(C) * E(G)	-.048	.031	3208.460	-1.522	.128	-.109	.014
PS(C) * A(G)	.023	.032	4438.219	.729	.466	-.039	.086
PS(C) * S(G)	**-.058**	.019	3912.894	-3.036	**.002**[*]	-.096	-.021
PS(C) * R(G)	.049	.038	4315.723	1.282	.200	-.026	.123
IT(C) * T(G)	-.013	.032	3532.014	-.395	.693	-.075	.050
IT(C) * E(G)	.040	.031	3846.755	1.294	.196	-.021	.102
IT(C) * A(G)	.007	.030	3598.601	.236	.814	-.051	.065
IT(C) * R(G)	-.064	.037	3692.060	-1.737	.082	-.136	.008
IT(C) * S(G)	**.037**	.018	1806.702	2.125	**.034**[*]	.003	.072
CT(C) * T(G)	-.026	.037	4086.073	-.708	.479	-.098	.046
CT(C) * E(G)	.044	.037	4102.774	1.204	.229	-.028	.117

CT(C) * A(G)	-.004	.034	4249.224	-.119	.906	-.070	.062
CT(C) * R(G)	.025	.044	4310.786	.569	.569	-.061	.110
CT(C) * S(G)	-.034	.020	3266.607	-1.719	.086	-.073	.005
LA(C) * T(G)	-.028	.035	3975.286	-.796	.426	-.096	.041
LA(C) * E(G)	-.027	.034	3718.369	-.792	.428	-.093	.040
LA(C) * A(G)	.019	.034	4321.934	.552	.581	-.048	.086
LA(C) * R(G)	-.004	.042	4365.400	-.099	.922	-.087	.078
LA(C) * S(G)	**.048**	.019	2913.024	2.584	**.010**[*]	.012	.085

Note: [*] **< .05 (two-tailed test)**

Discussion

Basic Statistics and Correlation

The average among four items of individual competencies (PS, IT, CT, and LA) was higher than 3.45, and the score of the competency in learning autonomy (LA) was the highest (mean=3.52). Recent studies have demonstrated that individuals can develop and enhance their LA competency through e-learning (Cheng et al., 2011; Lan, 2018; Lai, 2019; Snodin, 2013). Therefore, it may be the reason that IT competency was almost 3.5 points and significantly positive to LA in the correlation analysis. Besides, institutional variables, e.g., teacher, equipment, administration, and reputation had a strong positive correlation. These findings conform to other studies that an institution with sufficient resources can retain talents and leads to an excellent performance (Xanthopoulou et al., 2007; Demerouti et al., 2001).

In the present study, several other factors related to alumni's workplace and job satisfaction, such as salary, job title, and the promotion system, remained unknown and hence not covered. This could be a subject for future research. There are three sets of alumni surveys, e.g., one year, three years, and five years after graduation in the case university. In the present study, the alumni survey concerning job satisfaction was carried out after one year of graduation; therefore, participants had limited work experience. Volkwein and Zhou (2003) described those employees' job satisfaction increases when they become more accustomed to their tasks. Besides, inner motivation or aptitude for carrying out tasks positively affects job satisfaction (Houston et al., 2006). Thus, individual students' job satisfaction can be improved by a longer stay in the job and by continuous task learning at the workplace.

The main effect of Institution's Role in Alumni Competency

In the HLM analysis of level two, the institutional factors between 'Teacher' and 'Administration' were positively related to job satisfaction. A good student-teacher relationship can create a secure and satisfying relationship (Agrawal et al., 2019; Furrer & Skinner, 2003; Hughes & Chen, 2011). Higher education institutions need to view students as lifelong commitments that do not end at graduation. Alumni are resources that can provide meaningful and mutually beneficial relationships over time. Maintaining good long-term relationships with alumni is crucial to the success of institutions. Alumni serve many valuable roles, such as building and growing an institution's brand through word-of-mouth marketing. Higher education institutions rely on alumni to provide mentoring, internships, and career opportunities to students. Besides, alumni are a prime target for continuing education opportunities. Advanced professional programs, unlike undergrad programs, are quite profitable because they rely on minimal tuition discounting and financial aid. Alumni have much to offer, including knowledge about current and emerging job opportunities for students, a first-hand external view of the relevance and quality of education and teachers (Moore & Kuol, 2007). With alumni connections and resources, universities can achieve their strategic goals.

Moderated Effect between Institutional Service and Alumni's Job Satisfaction

According to Dewey (1997), service-learning evolves from doing and knowing, emotions, intellect, experience, and knowledge. Results indicate that the moderated effect between institutional and individual variables, institutional training for service-learning, played an important role in job satisfaction. The alumni had proper information technology application or autonomy learning. It has been reported that students with the experience of service-learning and positive social interaction had higher satisfaction levels at the workplace (Cho et al., 2020; Ocal & Altinok, 2016; Wozencroft & Hardin, 2014). Service-learning promotes interpersonal relationships and leads to significant improvement in activities, learning motivation, and job performance (Huang, 2007). However, alumni trained with service-learning and good professional skills had lower job satisfaction, indicating a gap between the teaching at school and the workplace. Bridging this gap involves making school more relevant for both students and employers so that more stakeholders can contribute to the future workforce's education. Creative and innovative partnerships between workplaces and schools are important so that accurate understanding can occur between students and employers. Job shadows, internships, co-ops, mentorships, partner-talks, and creative community projects need to be a regular part of school subjects (Magnifico, 2007). Some scholars suggested that competency-based teaching and learning can improve the curriculum's quality and shorten the gap between theoretical knowledge and vocational application (Agrawal et al., 2021; Gunawardena, 2014; Steel, 2018). Therefore, a service-learning course related to internships and projects can improve the Learn-Practice Fit and workplace satisfaction.

Implications and Recommendations

As a result of rapid technological advancement and globalization, there is a greater need to examine employers' requirements concerning desirable employee competencies. This has led to increasing demand by employers that universities produce practically work-ready graduates. Therefore, it is imperative that higher educational institutions pay much attention to graduates' competency-based teaching and learning. This can shorten the gap between theory and practice and improve students' satisfaction levels at workplaces. Universities must encourage graduates to acquire job-oriented skills and competencies and provide them with higher incentives and resources in the form of awards, subsidies wherever required.

In this study, three sets of alumni surveys were analyzed, e.g., one year, three years, and five years after graduation in the case university. However, the alumni survey concerning job satisfaction was analyzed after one year of graduation; therefore, participants had limited work experience. Since workplace experience is an important variable for the institution to explore alumni's job satisfaction, alumni survey data during three and five years would be interesting for collection and analysis in the future.

Concerning organization, 'Teacher' and 'Administration' at the case university were positive to job satisfaction. Therefore, good student-teacher relationships, innovative pedagogy, passionate and efficient service, and sufficient resources are important strategies for the institution's growth and graduates' career development.

According to the service-learning training, the institutional service with individual information technology application or autonomy learning can improve job satisfaction. There is an e-learning partner plan running for the last three years in the case university. The core value is "life accompanying life and living teaching living." The program helps undergraduates cultivate a spirit of service-learning. The success of the e-learning partner plan could be a model for other curriculums. Besides, service-learning with autonomy learning can help undergraduates to develop independent and mature thinking before they play leadership roles on the campus and beyond.

Learning by doing can enhance the Learn-Practice Fit and bridge the gap between campus and workplaces. Also, a discussion with industry experts in designing curriculums is an important step. The common and professional competencies can be evaluated through a competency assessment system to match campus competency development requirements and students' job satisfaction after graduation.

Conclusions

A multilevel framework was used to test the theory and establish empirical findings in this research to advance alumni career track and institutional development. All the factors between individual competency and institutional service were significantly positive to each other. In the HLM analysis, service-learning positively moderated the information technology application and the learning autonomy to job satisfaction. It is hoped that results in the present study would enrich the research on alumni surveys and stimulate future multilevel analysis.

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