The effect of the internet during COVID-19 on work using the manova algorithm

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Abstract. This study aims to find information about the major impact of the internet sites frequented by university alumni on the fate of those who are fast finding jobs and those who have not found work during the COVID-19 pandemic. This research uses a field survey method of university graduates, both those who have found jobs and those who have not. This study uses the manova algorithm with a GLM approach. The results of this study indicate that there is a very large impact on the types of internet sites that are most visited by people who are already working with people who have not worked. This research is only conducted in big cities and can be used to awaken the awareness of university alumni to find jobs more quickly by paying attention to their priorities every time they use the internet.

1. Introduction

The Central Statistics Agency (BPS) noted that the amount of workforce in Indonesia in February 2020 was 137,910,000 people [1]. This rate is up 1,730,000 people compared to February 2019. Meanwhile, at the same time, the amount of people not work has increased by 60,000 people [1]. Job street Indonesia Country Manager Faridah Lim explained, more than 50 % of the workforce in Indonesia experienced the consequent of the COVID-19 pandemic, whether it was laid off or temporarily laid off [2]. The problem is that undergraduate graduates do not know exactly what causes them not to work. Work and not working for someone is not necessarily caused by COVID-19, it could be due to the attitude of each individual, especially in using internet sites. In this era of the COVID-19 pandemic, job seekers must be able to take benefit of the opportunities that exist on the internet to get a job immediately. But in fact, many job seekers make the wrong choice of internet sites that are commonly visited so that they do not get the desired job. In this study, an investigation was carried out to whether there was a real difference between people who were fast able to work and unemployed people when viewed from the side of the internet sites they frequently visited. This research was conducted to find out the consequent of using internet sites during the COVID-19 pandemic to determine whether a person can immediately get a job or not. The study was conducted to know the difference between the attitudes of those who immediately got a job and the attitudes of those who had not yet found a job in terms of the types of internet sites they frequently visited. This research using the Manova algorithm because the Manova algorithm is very appropriate for cases consisting of two consequence variables. This research will focus on efforts to help undergraduate graduates to get a job immediately by utilizing internet sites that can support them to immediately get a job.
Figure 1. State of the art

The state of the art from this research can be seen in Figure 1. The second part of this paper is a literature review related to this research, especially Manova. The third part describes the variables used in this research methodology. The fourth part is the result of this research. The fifth part is the conclusion of the research results.

2. Literature Review

As a response to the COVID-19 pandemic, many governments have introduced steps such as spatial distancing and “staying at home” to curb its spread and impact [3]. During the Covid-19 period, the community empowered more means of communication via the internet, especially for jobs that could be done online, even looking for work could be done online. Advancements in technology have a massive impact on the workplace including recruitment of staff [4]. Previous researchers have developed and evaluated experimentally a novel tool that redesigns the job search process by providing tailored advice at low cost [5]. In this study, using the Manova algorithm to know the differences in the characteristics of each person who is fast working and those who are still unemployed in terms of the types of internet sites they frequently visit. Manova can be thought of as an Anova with several criterion variables [6]. Multivariate data occur naturally in a variety of disciplines, for example in the life sciences, where typically more than one response variable (endpoint) is measured on each subject [7, 8]. Just to provide two examples illustrating different fields of application, in a study comparing patients with spinal cord injury and a control group, different variables quantifying motor cortical output were measured [9]. Manova is a member of the General Linear Model—a family of statistical procedures that are often used to quantify the strength between variables [10]. Many of the procedures in the GLM are hierarchically organized—i.e., more specific procedures are often special cases of general procedures [11]. Manova, specifically, is an Anova that has two or more consequence variables [12].

3. Research Methodology

This study using manova algorithm. In the manova algorithm it is consisted of two sorts of variables, that is: 1. Consequence Variable. Consequence variables in this study are the span of time to find a suitable job and period of time doesn't work, 2. Predictor Variable. In this study, the predictor variables are the types of the internet site. The manova algorithm is used to see the effect of the predictor variable on the consequence variable. This study analyzed the influence of the type of internet site most visited by university alumni on the speed of finding a suitable job and period of time doesn't work. Figure 1 shows the research flowchart of the manova algorithm.
4. Results

In order to know the characteristics of a person in utilizing internet site services, a sample of 100 people were taken as shown in Figure 3, with details: the name of the university alumni, the internet site facility, the span of time to find a suitable job (in weeks), period of time doesn't work (in weeks), the types of internet site that are most visited for game content, religion, education, and employment. In this study, was there any impact on the type of internet site that was most visited with the span of time to find a suitable job and period of time doesn't work? In Manova it is assumed whether the variance-covariance matrix of the consequence variable is the same as the predictor variable [13]. Manova output can best be explained if the variance-covariance matrix of the consequence variables is relatively the same in each group of predictors. The variance-covariance test can be tested together and it can also be a variable test per consequence [14]. Collaborative testing using Box’s M. [15]. H₀ = The two consequence variables (the span of time to find a suitable job and period of time doesn't work) have the same variance-covariance matrix in the predictor variable (types of the internet site of employment, religion, game content, and education). H₁ = The two consequence variables (the span of time to find a suitable job and period of time doesn't work) have different variance-covariance matrices in the predictor variable (types of the internet site of employment, religion, game content, and education). If the score is Sig. > 0.05 then H₀ is accepted. If the score is Sig. < 0.05, then H₀ is rejected. From Table 1, it can be seen that the Box's M score is 2.96 with the Sig. 0.88. Because the number is far above 0.05, H₀ is accepted. This means that the variance-covariance matrix on the variables of the span of time to find a suitable job and period of time doesn't work is the same for each group of the respondent's internet site types.
Table 1. Box’s Test of Equality of Covariance Matrices

| Effect           | Value | dF1 | dF2 | Sig.  |
|------------------|-------|-----|-----|-------|
| Box’s M          | 2.96  |     |     |       |
| F                | 0.399 |     |     |       |
| df1              | 6     |     |     |       |
| df2              | 690.81|     |     |       |
| Sig.             | 0.88  |     |     |       |

Table 2. Levene's Test of Equality of Error Variances

| Effect                                      | Levene Statistic | dF1 | dF2 | Sig.  |
|---------------------------------------------|------------------|-----|-----|-------|
| the span of time to find a suitable job (week) Based on Mean | 7.323            | 3   | 26  | 0.001 |
| Based on Median                             | 1.356            | 3   | 26  | 0.278 |
| Based on Median and with adjusted df         | 1.356            | 3   | 19.612 | 0.285 |
| Based on trimmed mean                        | 6.345            | 3   | 26  | 0.002 |
| period of time doesn't work (week) Based on Mean | 1.510            | 3   | 26  | 0.235 |
| Based on Median                             | 1.477            | 3   | 26  | 0.244 |
| Based on Median and with adjusted df         | 1.477            | 3   | 24.667 | 0.245 |
| Based on trimmed mean                        | 1.539            | 3   | 26  | 0.228 |

Table 3. Multivariate Tests

| Effect                | Value | F      | Hypothesis df | Error df | Sig.  |
|-----------------------|-------|--------|---------------|----------|-------|
| Intercept Pillai's Trace | 0.998 | 5178.28 | 2             | 25       | 0     |
| Wilks' Lambda         | 0.002 | 5178.28 | 2             | 25       | 0     |
| Hotelling's Trace     | 414.262 | 5178.28 | 2            | 25       | 0     |
| Roy's Largest Root    | 414.262 | 5178.28 | 2            | 25       | 0     |
| Internet site Pillai's Trace | 0.74  | 5.087  | 6             | 52       | 0     |
| Wilks' Lambda         | 0.262  | 7.961b | 6             | 50       | 0     |
| Hotelling's Trace     | 2.819  | 11.275 | 6             | 48       | 0     |
| Roy's Largest Root    | 2.817  | 24.414c | 3           | 26       | 0     |

$H_0 = \text{certain consequence variable (the span of time to find a suitable job or period of time doesn't work) has the same variance-covariance matrix in predictor variable (types of the internet site of employment, religion, game content, and education).} H_1 = \text{certain consequence variable (the span of time to find a suitable job or period of time doesn't work) has different variance-covariance matrices in predictor variable (types of the internet site of employment, religion, game content, and education).} \text{The difference with the previous hypothesis is only in the use of one consequence variable. If the score is Sig. > 0.05 then H_0 is accepted. If the score is Sig. < 0.05, then H_0 is rejected. The Table 2 shows the significance of the Levene test for the two consequence variables, namely the variable of the span of time to find a suitable job and period of time doesn't work. Because the two scores are far above 0.05, H_0 is accepted. This means that the variance-covariance matrices on the variable of the span of time to find a suitable job and period of time doesn't work individually are the same for each group of the respondent's internet site types. Since the assumption of variance-covariance equality is fulfilled, the manova analysis process can be continued. There are two parts to the manova output, namely the output which states whether there is a significant difference between groups, and the output which tests each variable individually. The two types of output will be analyzed one by one. The results of the multivariate significance test are shown in Table 3.}$

$H_0 = \text{the span of time to find a suitable job and period of time doesn't work together did not show a difference in the various types of the internet site of the respondents.} H_1 = \text{the span of time to find a suitable job and period of time doesn't work, together shows a significant difference in the various types of the internet site of the respondents. If the score is Sig. > 0.05 then H_0 is accepted. If the score is Sig.}$
< 0.05, then H₀ is rejected. Note the line of internet site types at significance levels tested by Pillai, Wilk's lambda, Hotteling, and Roy's procedures. All four procedures show scores below 0.05. Thus H₀ is rejected. Because H₀ is rejected, then together, the span of time to find a suitable job and period of time doesn't work is indeed influenced by the type of internet site that is frequently visited by a person. Maybe someone often visits the type of internet sites such as employment and education will make someone faster to get a job following their field of expertise or other possibilities. The output between subjects (the influence of individual variables) is shown in Table 4. For variable graduation length: H₀ = the span of time to find a suitable job does not show any differences in the various types of internet sites frequently visited by respondents. H₁ = the span of time to find a suitable job shows a significant difference in various types of internet sites frequently visited by respondents. For long idle variables: H₀ = period of time doesn't work variable does not show any difference in the various types of internet sites frequently visited by respondents. H₁ = period of time doesn't work variable shows significant differences in various types of internet sites frequently visited by respondents. If the score is Sig. > 0.05 then H₀ is accepted. If the score is Sig. < 0.05, then H₀ is rejected. Pay attention to the type of internet site line, especially the significance number. It can be seen that for the consequence variable of the span of time to find a suitable job, the significance score is below 0.05. Thus, to test the variable of the span of time to find a suitable job, it was decided to reject H₀. So the span of time to find a suitable job is indeed influenced by the type of internet site that a person frequently visits. Pay attention to the type of internet site line, especially the significance number. It can be seen that the consequence variable (period of time doesn’t work), the significance score is below 0.05. Thus, to test the variable period of time doesn’t work, it was decided to reject H₀. So the length of unemployment is indeed influenced by the type of internet site that someone frequently visits. So, if the multivariate test is carried out together, the span of time to find a suitable job and period of time doesn't work are different in the four groups of internet site types frequently visited by respondents.

Table 4. Tests of Between-Subjects Effects

| Source            | Consequence Variable                        | Type III Sum of Squares | Df | Mean Square | F     | Sig. |
|-------------------|---------------------------------------------|-------------------------|----|-------------|-------|------|
| Corrected Model   | the span of time to find a suitable job     | 3.44                    | 3  | 1.147       | 22.894| 0    |
|                   | (weeks)                                    |                         |    |             |       |      |
|                   | period of time doesn’t work (weeks)        | 5.611                   | 3  | 1.87        | 3.327 | 0.035|
| Intercept         | the span of time to find a suitable job     | 434.678                 | 1  | 434.678     | 8679.65| 0    |
|                   | (weeks)                                    |                         |    |             |       |      |
|                   | period of time doesn’t work (weeks)        | 180.045                 | 1  | 180.045     | 320.272| 0    |
| Internet site     | the span of time to find a suitable job     | 3.44                    | 3  | 1.147       | 22.894| 0    |
|                   | (weeks)                                    |                         |    |             |       |      |
|                   | period of time doesn’t work (weeks)        | 5.611                   | 3  | 1.87        | 3.327 | 0.035|
| Error             | the span of time to find a suitable job     | 1.302                   | 26 | 0.05        |       |      |
|                   | (weeks)                                    |                         |    |             |       |      |
|                   | period of time doesn’t work (weeks)        | 14.616                  | 26 | 0.562       |       |      |
| Total             | the span of time to find a suitable job     | 607.75                  | 30 |             |       |      |
|                   | (weeks)                                    |                         |    |             |       |      |
|                   | period of time doesn’t work (weeks)        | 257.11                  | 30 |             |       |      |
| Corrected Total   | the span of time to find a suitable job     | 4.742                   | 29 |             |       |      |
|                   | (weeks)                                    |                         |    |             |       |      |
|                   | period of time doesn’t work (weeks)        | 20.227                  | 29 |             |       |      |
5. Conclusion
From the results of the study, it can be concluded that there are significant differences in terms of the types of internet sites frequently visited by respondents who have been unemployed for a long time and respondents who immediately get a suitable job. Respondents who frequently visit internet sites such as employment and education tend to find jobs that are suitable for their areas of expertise faster. In future research, it can be surveyed the alumni of university graduates from Southeast Asia for further research on the websites that are frequently visited in relation to the speed of getting jobs in accordance with their fields.

6. References
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