

Prediction of the Number of Graduates Absorption by the Field of ExpertiseIda Farida^{1✉}, Guruh Taufan Hariyadi², Aries Setiawan³^{1,2,3} Management Study Program, Faculty of Economics and Business, Dian Nuswantoro University, Semarang, Indonesia**Article Information***Article history:*

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Abstract

The study program accreditation process also includes reporting forms filled in with the number of graduates working according to their field of expertise. A low conformity rate will indicate a lack of training and skills for graduates. If the conformity rate is high, it will affect the results of accreditation to increase and make the level of public trust in the study program higher, as well as from the perspective of graduate staff users. The study program needs to know the data of its graduates earlier as a step to increase the compatibility rate of the field of work with the field of lectures for its graduates. These problems can be minimized by carrying out a prediction process on the suitability of graduate fields. The variable used to predict is a data series of the number of graduates working in the right field over a certain period of time. The use of linear regression for predictions in the case of determining the exact field really helps make it easier for study programs to help predict the number of students who graduate by working in the right field. This study uses a linear regression method.

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INTRODUCTION

The discrepancy between areas of expertise during college and work is one of the factors causing unemployment, besides that another factor is the lack of resource development for prospective college graduates. Education and training in accordance with the study program are factors that strongly support the development of prospective graduate resources. Knowledge is not only the fruit of a training, but can give more than that, increased skills in work and productivity will also increase. According to Muhson (2012), productivity is related to a personal attitude that always wants to move and advance in improving the quality of life

A college graduate certainly wants a job that is in accordance with his field, but the reality is not necessarily what he dreamed of. Something that might be illustrated from this is that there are many graduates with high academic results but get job opportunities in jobs that are not in accordance with the areas of expertise obtained in college. This is because the mastery of practice is less than the theory obtained.

Academics need to know this as a step to increase the suitability rate for their graduates. Academics need to record the condition of alumni, work in appropriate or inappropriate fields and then periodically need to keep track of every graduate. This is done as a step to improve the quality of prospective graduates, if the job compatibility rate is in accordance with the area of expertise, steps need to be taken to improve the skills of prospective graduates, such as adding training content to lecture activities.

The study program accreditation process also includes reporting forms filled in with the number of graduates working according to their field of expertise. According to Suhendra (2019), a low conformity rate will indicate a lack of training and skills for graduates. If the conformity rate is high, it will affect the results of accreditation to increase and make the level of public trust in the study program higher, as well as from the perspective of graduate staff users.

The problems described above can be minimized by carrying out a prediction process through the creation of predictive application software for the suitability of graduate fields, this needs to be done as a decision-making tool to improve the quality of future graduates to suit their areas of expertise. The variable used to predict is a data series of the number of graduates working in the right field over a certain period of time. In the journal Harlian (2017) it is stated that the method used for calculations is linear regression, which is a prediction method that connects at least one independent variable and one dependent variable to predict the magnitude of the dependent value.

The novelty value of this research is that the results of this research aim to predict graduates who will be absorbed in each graduate field, so that study program managers are able to take steps to improve their graduates so they can work according to their field of expertise.

METHOD

Research data was taken from all students of the Dian Nuswantoro University management study program for the 2020 to 2022 academic year who took final assignment courses, with a total of 2934 people. The research object of this research is the management final project coordinator who is in charge of managing all student final assignment data

According to Wulandari (2018), prediction as a process that is carried out from a number of data to predict or predict values or events in the future is the meaning of a prediction.

In another sense, stated by Navian (2017), that predictions are based on experience and history, also based on the decisions of an expert. Prediction combines science in the process of predicting future conditions with certain methods of applying subjective models of calculations and predictions.

Predictions according to Sulistyono (2017) are a form of decision making which is the basis for decision makers in several industries or agencies with the aim of agencies being able to produce policies that are timely and able to have a positive impact on other subjects.

A curve matching technique with low accuracy, this data can be measurement data, the process is to create a function that approaches the data points. Linear regression performs forecasting by constructing new patterns that are interrelated to previous data. Some conditions that do require a linear regression are the presence of information relating to previous events, the existing information can be represented in the form of words or numbers, it can be assumed that the form of relationships and past data can be continued in the future.

In the research conducted by Pertiwi (2017), states that the regression analysis is a relationship between two independent variables and the independent variable, while the multiple regression analysis is a relationship using a minimum of three variables, two independent variables and one independent variable.

The benefits of this method as mentioned by Katemba (2017) include being more accurate in conducting correlation analysis, because the analysis is quite difficult in changing the level of change of one variable to another. With linear regression the forecasting process for the value of the dependent variable on the value of the independent variable is more accurate. Besides being linear, it is also useful to know the direction of the relationship between the dependent variable, positive or negative in predicting the value of the independent variable. The data scale used is interval or ratio.

In simple linear regression prediction, causal factors such as in research Katemba (2017) are referred to as predictors symbolized by the letter X and the effect variable is referred to as the response, symbolized by the letter Y, the linear regression equation is:

$$Y = a + bX \tag{1}$$

Equation (1) above consists of input:

a = intership;

b = slope of the linear trend

x = time period (x=1, 2, 3, ... n), n

The values of a and b are obtained from:

$$a = \frac{(\sum Y)(\sum X^2) - \sum X(\sum XY)}{n(\sum X^2) - (\sum X)^2} \tag{2}$$

$$b = \frac{n(\sum XY) - (\sum X)(\sum Y)}{n(\sum X^2) - (\sum X)^2} \tag{3}$$

In the research on the prediction of graduates working in the right field of the management study program using a quantitative approach, namely by observing data in the management study program with an approach of the number of graduates working in the right field of case studies for alumni of the management study program at Dian Nuswantoro University Semarang.

As for the subject of data acquisition, namely the Career Center which has provided information about the work of alumni from the management study program every graduation period.

Variables that affect the test results include (1) the number of graduates, (2) the number of graduates according to the field or major of the lecture (3) the number of graduates who do not match the field or major of the lecture. The number of graduates who are not yet working is not used as a variable in this study

RESULT AND DISCUSSION

Data is taken from management study programs that are collected up to the 2020 graduation year, as follows:

Alumni data is taken from management study programs that have graduated and their fields of work, with years of graduation between 2000 and 2020 with a total of 2934 data lines, as follows:

Tabel 1. Initial Datasets

No.	NIM	Name	Graduation Year	Graduation To	Work	Field Compability
1	B11.2016.04114	Resta P.	2020	70	Administration	In accordance
2	B11.2016.04186	Ferliana A.	2020	70	Cashier	In accordance
3	B11.2016.04081	Gista M.	2020	70	StaffManager	In accordance
4	B11.2016.04203	RiskaDwi	2020	70	Secretary	In accordance
5	B11.2016.04034	M.Ridwan	2020	70	Police	It is not in accordance with
6	B11.2013.03050	M.Rizqi F.	2020	70	Auditors	In accordance
7	B11.2016.03949	Nida R.	2020	70	Msdm	In accordance
8	B11.2015.03709	Mia Dika	2020	70	Writer	It is not in accordance with
9	B11.2015.03717	Siti Nurul	2020	70	Marketing	In accordance
10	B11.2016.03960	Arie Dwi	2020	70	Administration	In accordance
11	B11.2013.02884	Gilang Eka	2020	70	Marketing	In accordance
12	B11.2016.04320	Hendra W.	2020	70	Programmer	It is not in accordance with
13	B11.2015.03692	Luqman	2020	70	Auditors	In accordance
14	B11.2013.03120	Siska Putri	2020	70	Cashier	In accordance
15	B11.2014.03330	Nur Ida	2020	70	Secretary	In accordance
16	B11.2013.03109	Febi Ayu	2020	70	Customer Service	In accordance
17	B11.2016.04173	Wiwin W.	2020	70	Production manager	In accordance
18	B11.2016.04140	Kristiana	2020	70	Administration	In accordance
19	B11.2013.02943	D. Candra	2020	70	Financial Analyst	In accordance
20	B11.2013.03093	Lukman	2020	70	Administration	In accordance
21	B11.2012.02456	Aninditya	2020	70	Marketing Manager	In accordance
22	B11.2014.03321	Marcella A.	2020	70	Administration	In accordance
23	B11.2016.04179	Rian Adi	2020	70	Manager	In accordance
24	B11.2016.03954	AdindaDiza	2020	70	Policewoman	It is not in accordance with
25	B11.2015.03885	M. Faisal	2020	70	Financial Analyst	In accordance
.
.
2934

Furthermore, from the data above, it is summarized into data ready for processing as follows:

Table 2. The Dataset is Ready to be Processed

No.	Graduation Year	Graduation To	Number Of Graduates (X1)	Numbers Do Not Accord To Fields (X2)	Amount According To Field (Y)
1	2000	17	13	2	11
2	2001	18	14	5	5
3	2001	19	15	3	10
4	2002	20	6	1	5
5	2002	21	15	3	9
6	2003	22	21	6	12
7	2003	23	34	5	25
8	2004	24	25	6	15
9	2004	25	58	5	50
10	2005	26	32	7	20
11	2005	27	72	5	60
12	2006	28	48	7	35
13	2006	29	45	3	40
14	2007	30	46	6	35
15	2007	31	67	7	56
16	2008	32	53	8	43
17	2008	33	69	4	60
18	2009	34	70	5	53
19	2009	35	67	2	62
20	2009	36	64	4	55
21	2010	37	66	5	56
22	2010	38	72	7	60
23	2010	39	65	4	56
24	2011	40	60	5	52
25	2011	41	79	8	67
26	2011	42	50	5	41
27	2012	43	89	7	77
28	2012	44	67	5	60
29	2012	45	56	3	51
30	2013	46	32	5	28
31	2013	47	17	6	11
32	2013	48	47	4	40
33	2013	49	61	5	50
34	2014	50	56	3	50
35	2014	51	48	1	43
36	2014	52	28	3	23
37	2015	53	75	4	63
38	2015	54	53	6	45
40	2015	55	42	5	32
41	2016	56	81	14	70
42	2016	57	42	9	30
43	2016	58	62	3	55
44	2017	59	112	9	98
45	2017	60	68	10	61
46	2017	61	64	9	50
47	2018	62	74	7	62
48	2018	63	71	7	53
49	2018	64	78	8	60
50	2019	65	95	7	82
51	2019	66	91	6	80
52	2019	67	67	6	56
53	2020	68	63	6	54
54	2020	69	69	6	60
Σ			2934	292	2437

Table 3. Linear Regression Result

No.	Graduation Year	Graduation To	Number Of Graduates (X1)	Number s Do Not Accord To Fields (X2)	Amount According To Field (Y)	Y ²	X ₁ ²	X ₂ ²	X ₁ Y	X ₂ Y	X ₁ X ₂
1	2000	17	13	2	11	21	169	4	143	22	26
2	2001	18	14	5	5	25	196	25	70	25	70
3	2001	19	15	3	10	100	225	9	150	30	45
4	2002	20	6	1	5	25	36	1	30	5	6
5	2002	21	15	3	9	81	225	9	135	27	45
6	2003	22	21	6	12	44	441	36	252	72	126
7	2003	23	34	5	25	625	1156	25	850	125	170
8	2004	24	25	6	15	225	625	36	375	90	150
9	2004	25	58	5	50	2500	3364	25	2900	250	290
10	2005	26	32	7	20	400	1024	49	640	140	224
11	2005	27	72	5	60	3600	5184	25	4320	300	360
12	2006	28	48	7	35	1225	2304	49	1680	245	336
13	2006	29	45	3	40	1600	2025	9	1800	120	135
14	2007	30	46	6	35	1225	2116	36	1610	210	276
15	2007	31	67	7	56	3136	4489	49	3752	392	469
16	2008	32	53	8	43	1849	2809	64	2279	344	424
17	2008	33	69	4	60	3600	4761	16	4140	240	276
18	2009	34	70	5	53	2809	4900	25	3710	265	350
19	2009	35	67	2	62	3844	4489	4	4154	124	134
20	2009	36	64	4	55	3025	4096	16	3520	220	256
21	2010	37	66	5	56	3136	4356	25	3696	280	330
22	2010	38	72	7	60	3600	5184	49	4320	420	504
23	2010	39	65	4	56	3136	4225	16	3640	224	260
24	2011	40	60	5	52	2704	3600	25	3120	260	300
25	2011	41	79	8	67	4489	6241	64	5293	536	632
26	2011	42	50	5	41	1681	2500	25	2050	205	250
27	2012	43	89	7	77	5929	7921	49	6853	539	623
28	2012	44	67	5	60	3600	4489	25	4020	300	335
29	2012	45	56	3	51	2601	3136	9	2856	153	168
30	2013	46	32	5	28	784	1024	25	896	140	160
31	2013	47	17	6	11	121	289	36	187	66	102
32	2013	48	47	4	40	1600	2209	16	1880	160	188
33	2013	49	61	5	50	2500	3721	25	3050	250	305
34	2014	50	56	3	50	2500	3136	9	2800	150	168
35	2014	51	48	1	43	1849	2304	1	2064	43	48
36	2014	52	28	3	23	529	784	9	644	69	84
37	2015	53	75	4	63	3969	5625	16	4725	252	300
38	2015	54	53	6	45	2025	2809	36	2385	270	318
40	2015	55	42	5	32	1024	1764	25	1344	160	210
41	2016	56	81	14	70	4900	6561	196	5670	980	1134
42	2016	57	42	9	30	900	1764	81	1260	270	378
43	2016	58	62	3	55	3025	3844	9	3410	165	186
44	2017	59	112	9	98	9604	12544	81	10976	882	1008
45	2017	60	68	10	61	3721	4624	100	4148	610	680
46	2017	61	64	9	50	2500	4096	81	3200	450	576
47	2018	62	74	7	62	3844	5476	49	4588	434	518
48	2018	63	71	7	53	2809	5041	49	3763	371	497
49	2018	64	78	8	60	3600	6084	64	4680	480	624
50	2019	65	95	7	82	6724	9025	49	7790	574	665
51	2019	66	91	6	80	6400	8281	36	7280	480	546
52	2019	67	67	6	56	3136	4489	36	3752	336	402
53	2020	68	63	6	54	2916	3969	36	3402	324	378

54	2020	69	69	6	60	3600	4761	36	4140	360	414
Σ		2934	292	2437	135615	190510	190510	1900	160392	14439	17459

The next solution, by following the calculation below:

$$\Sigma X_1^2 = \Sigma X_1^2 - ((\Sigma X_1)^2/n) = 190510 - (2934^2 / 54) = 190510 - 159414 = 31096$$

$$\Sigma X_2^2 = \Sigma X_2^2 - ((\Sigma X_2)^2/n) = 1900 - (292^2/54) = 1900 - 1579 = 321$$

$$\Sigma X_1X_2 = \Sigma X_1X_2 - (((\Sigma X_1)(\Sigma X_2))/n) = 17459 - (((2934)(292))/54) = 1594$$

$$\Sigma X_1Y = \Sigma X_1Y - (((\Sigma X_1)(\Sigma Y)) / n) = 160392 - (((2934)(2437))/54) = 27981$$

$$\Sigma X_2Y = \Sigma X_2Y - (((\Sigma X_2)(\Sigma Y)) / n) = 14439 - (((292)(2437)) / 54) = 1261$$

$$\Sigma Y^2 = \Sigma Y^2 - ((\Sigma Y)^2/n) = 135615 - ((2437)^2 / 54) = 25634$$

$$b_1 = ((\Sigma X_2^2)(\Sigma X_1Y) - (\Sigma X_2Y)(\Sigma X_1X_2)) / ((\Sigma X_1^2)(\Sigma X_2^2) - (\Sigma X_1X_2)^2)$$

$$= ((1900)(160392) - (14439)(17459)) / ((190510)(1900) - (17459)^2)$$

$$= 0.92$$

$$b_2 = ((\Sigma X_1^2)(\Sigma X_2Y) - (\Sigma X_1Y)(\Sigma X_1X_2)) / ((\Sigma X_1^2)(\Sigma X_2^2) - (\Sigma X_1X_2)^2)$$

$$= ((190510)(14439) - (160392)(17459)) / ((190510)(1900) - (17459)^2)$$

$$= -0.86$$

$$a = (\Sigma Y - b_1\Sigma X_1 - b_2\Sigma X_2) / n$$

$$= (2437 - (0.92)(2934) - (-0.86)(292)) / 54$$

$$= -0.21$$

After the variables a, b1, b2 are known, they are then entered into the regression equation as follows, the values x1 and x2 are taken from the last data or the 54th data from the dataset in table 5.4.:

$$Y = a + b_1x_1 + b_2x_2$$

$$= -0.21 + (0.92)(69) + (-0.86)(6)$$

$$= 58,11 \text{ dibulatkan } (58)$$

So the prediction of field work graduates using linear regression, for data after the 55th (70th graduation) is 58 people

CONCLUSSION AND RECOMMENDATION

Based on the test above, the predicted value of the number of graduates in the right field in the 55th graduation period is not far from the number of graduates in the right field in the previous graduation period (54th period). So the use of linear regression for predictions in the case of determining the exact field really helps make it easier for study programs to get the predictive value of the number of graduates working in the right field. Henceforth, if there are still graduates who work in the wrong department, then the study program is able to determine policies to emphasize the number of graduates who work in the wrong field.

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