Reanalysis of Reading Process Data via Learning Analytics and Knowledge (LAK)

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Abstract

This paper reports reanalysis of reading process data via LAK. In the 20th anniversary conference of PAAL, experimental setting, kinds of data available via LAK (Aramoto, 2015) and their descriptive statistics were reported. In this paper, the results of stepwise multiple regression analysis is presented.

Keywords

Learning Analytics and Knowledge (LAK), Reading Process, Visualization of Reading Process, Reading Strategies

Introduction

LAK is supposed to combine Computer Sciences, Statistics and Education. It is suitable to analyze big data. Aramoto(2014, 2015) programmed Visualization of Reading Record which includes pre-questionnaire responses, reading time spent for each paragraph, listening time spent for internal audio tape, consultation time to built-in dictionary and publicly available dictionary, word test, multiple choice comprehension scores, descriptive response scores, the number of words written, specific use of reading strategies. Although the number of participants is small, the data obtained was massive. LAK has not been applied to reading process data.

1 Experiment

The experiment was run on the 8th of July, 2015. 11 participants were those who took 'World Englishes and Miscommunications,' instructed by Dr Yusuke Kondo, Global Education Center. 11 participants were those who took Programming Seminar instructed by Dr Kota Suko, School of Social Studies. 11 participants in the former group and 7 participants in the latter group completed the task.

1.1 Task Content

We asked the participants to respond pre-questionnaire items (experience scores, readiness scores, interest scores and knowledge scores, title inference scores and English Proficiency scores). After reading the news paper article entitled 'Tourism in Japan and the World,' they are asked which of 30 reading strategies were used during reading. They are also given a word test, multiple-choice comprehension questions and descriptive questions. We printed out the reading process graph and they were asked to mark at which point they used a specific reading strategy.

1.2 Result

We obtained 12 measures, the experience score indicating the extent of having read newspaper articles, readiness score in which the respondents reported how much they are ready to read the topic (Tourisim in Japan and the world), interest scores to indicate their interests in the topic, how much they can infer the content by looking at the title, Multiple-Choice Comprehension scores, Descriptive response scores, Word Test scores, time measures to finish reading the article, Global strategy scores, Cognitive strategy scores, Supportive strategy scores and pre-questionnaire total scores. English proficiency scores they reported were not reliable, since some students who had studied abroad had not taken any proficiency tests except for STEP tests they had taken at junior high schools. For this reason, English proficiency scores is not included in the data analysis.

Initially, it was hoped that the data can reveal the difference between good readers and poor readers. So, binominal logistic regression analysis was performed. Out of 66 paired correlation coefficients, 14 pairs yielded high correlations. This led us to suspect multi-colinearity inherent in the data. Variance Inflation Factor (VIF) , Tolerance (許容度), and

Condition Index(条件指標) was checked accordingly. Table 1 reveals that our intuition was correct. For this reason, we run stepwise multiple regression analysis. Table 1 represents the result.

Table 1: Multiple Regression Analysis

係数[a]

モデル		非標準化係数		標準化係数	t 値	有意確率	共線性の統計量		条件指数
		B	標準誤差	ベータ			許容度	VIF	
7	(定数)	25.455	7.365		3.456	.005			1.000
	Selfstudy	13.044	3.581	.576	3.643	.003	.849	1.178	3.561
	Knowledge	3.826	1.162	.559	3.294	.006	.739	1.353	3.893
	Cognitive	3.256	1.076	.582	3.026	.011	.575	1.740	5.866
	Supportti ve	−2.197	1.437	−.296	−1.530	.152	.568	1.760	11.419
	wordtest	−2.010	.907	−.421	−2.215	.047	.588	1.700	13.241
8	(定数)	23.934	7.664		3.123	.008			1.000
	Selfstudy	11.916	3.680	.527	3.238	.006	.887	1.128	3.312
	Knowledge	3.136	1.124	.458	2.790	.015	.871	1.149	5.448
	Cognitive	2.324	.931	.415	2.495	.027	.847	1.181	9.097
	wordtest	−1.295	.817	−.271	−1.585	.137	.801	1.249	10.938
9	(定数)	18.193	7.109		2.559	.023			1.000
	Selfstudy	11.123	3.838	.492	2.898	.012	.903	1.107	3.001
	Knowledge	2.738	1.153	.400	2.374	.032	.916	1.091	4.861
	Cognitive	1.799	.916	.321	1.963	.070	.969	1.032	9.019

a. 従属変数 CompScore

2 Discussion and Classroom Tips

Our experiment suggested that the factors, self-study, knowledge of the subject matter and cognitive strategies influence Composite Comprehension scores. This suggests that we encourage our students to read news paper article in their spare time. At the same time, before reading, we should check their knowledge of the subject matter. Our knowledge scores are derived from the simple questions:

I know both merits and demerits of Japanese tourism. What are they?

Tourism in Japan has problems. What are they?

Tourist spots in Japan is well known in the world.

The number of incoming tourists is increasing.

The number of tourists is decreasing.

I know the name of the countries from which most foreign visitors come.

It would be useful to remind the students of the simple common sense about the topic. The strategies they used are as follows:

12. I guessed what the context of the text is during reading. (global)

20. I reread to increase understanding when the text became difficult.

17. I paid closer attention to what I am reading, when the text becomes difficult.

18. I stopped from time to time and thought about what I am reading.

20. I reread to increase understanding when the text became difficult.

2. I think about what I k0w to help me to understand when I read. (global)

15. I tried to get back on track when I lost concentration.

16. I adjusted my reading speed according to what I am reading.

Apart from items, 12 and 2, the other strategies are all cognitive strategies. During the lesson, we should illustrate these cognitive strategies in reference to the visualized reading process graph.

References

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