Academic performance and Internet

Authors: Claudia Prieto Latorre, Luis Alejandro Lopez-Agudo, Mariano Luque Gallego, Oscar David Marcenaro-Gutierrez

Universidad de Málaga – claudiaprieto@uma.es; lopezagudo@uma.es; mluque@uma.es; odmarcenaro@uma.es

OBJETIVES

Adolescents increasingly spend more time connected to the Internet. The use of this tool has advantages and drawbacks. In this research work, we focus on the effect of the Internet usage for hobbies and school task on academic performance. We use four alternative measures of academic performance: competences and school grades in reading and maths.

Our purpose is to provide the profile of students who make a better use of the Internet to maximise different measures of academic performance. In order to do that, we use a census data of students attending secondary education in the Region of Andalusia.

METHODOLOGY

Our empirical strategy follows the methodology previously explored in the educational context by Marcenaro-Gutierrez et al. (2016), which combines econometric analysis and the use of multiobjective programming techniques.

The first step is to estimate the education production functions:

$$P_k(i) = \hat{\beta}_{k0}(i) + \hat{\beta}_{k1}x_1(i) + \hat{\beta}_{k2}x_2(i) + \hat{\beta}_{k3}x_3(i) + \cdots + \hat{\beta}_{k16}x_{16}(i) + \varepsilon_k(i) \qquad (1)$$

where P is the academic performance, x_1 to x_{16} are the explanatory variables, k represents the educational outcome ($k = 1,2,3,4$)

The second step is to solve the interval multiobjective programming problem, following the algorithm proposed in Henriques et al. (2018):

$$Max\ \mathrm{P}(x) = \left(P_1(x), P_2(x), P_3(x), P_4(x)\right) \qquad (2)$$
$$subject\ to\ \boldsymbol{x} \in X$$

$$\text{where } P_k(\mathrm{x}) = \left[\hat{\beta}_{k0}^L, \hat{\beta}_{k0}^U\right] + \left[\hat{\beta}_{k1}^L, \hat{\beta}_{k1}^U\right]x_1 + \cdots + \left[\hat{\beta}_{k16}^L, \hat{\beta}_{k16}^U\right]x_{16} \qquad (3)$$

$\hat{\beta}^L, \hat{\beta}^U$ are the lower and upper bound of the estimated coefficients.

TABLE

Table 1. Possibly efficient solution of the multiobjective interval problem and achieved values

Variables	Solution
Female student	1
Repeater before 8th grade	0
Socioeconomic level	0
Proportion of poor students in the school (1st quartile of the ESCS)	0.276
Internet for reading: every or almost every day	0
Internet for reading: Once/twice a week	1
Internet for reading: Once/twice a month	0
Internet for school tasks: every or almost every day	0
Internet for school tasks: Once/twice a week	1
Internet for school tasks: Once/twice a month	0
Internet for hobbies: every or almost every day	1
Internet for hobbies: Once/twice a week	0
Internet for hobbies: Once/twice a month	0
Internet for social networks: every or almost every day	0
Internet for social networks: Once/twice a week	0
Internet for social networks: Once/twice a month	0
Achieved values $P_k^L(\mathbf{x})$ / $P_k^U(\mathbf{x})$	
Competences in reading ($k = 1$)	523.722/571.601
Competences in maths ($k = 2$)	507.401/542.620
School grades in reading ($k = 3$)	6.987/8.009
School grades in maths ($k = 4$)	6.671/7.422

Source: Authors' own calculation.

RESULTS

The profile of student which maximise competences and school grades in reading and maths is a girl, who does not have repeated grade, and belongs to the 3rd quartile of the Index of Economic, Social and Cultural Status (Table 1). The sociocultural background of the school is also significant to explain the academic performance. According to our results, the school may have 26.7% of students from a low socioeconomic level.

In order to maximise the four educational outcomes, the recommended frequency of the use of the Internet depends on the type of activity that students do. For reading and doing school tasks, students should use the Internet once or twice a week. In case of using the Internet for searching information about hobbies (music, sport, etc…), adolescents should use it on a daily basis. However, they should not use Internet for social networks.

This profile of student achieve on average higher score in reading than in maths in both competences and school grades.

CONCLUSIONS

In general, we found that using Internet is positively associated with academic performance (except for social networks). In this sense, providing Internet access to students at home should be a priority for educational authorities.

Additionally, our results show that the type of use of the Internet and their frequency affect academic attainment. Because of that, it becomes very important parental control on children activities on the net.

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