

Measuring Learning Gain (0221)

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Background

This paper discusses two ways to measure the intellectual development or 'learning gain' of undergraduate students in higher education. The measurement of learning gain is hugely topical due to the governments White Paper's concentration on teaching excellence.

"We take a broad view of teaching excellence, including the teaching itself, the learning environments in which it takes place, and the outcomes it delivers. We expect higher education to deliver well designed courses, robust standards, support for students, career readiness and an environment that develops the 'soft skills' that employers consistently say they need. These include capacity for critical thinking, analysis and teamwork, along with the vital development of a student's ability to learn." (BIS, 2016, p. 43).

The White Paper states clearly that studying at a higher education institution should increase the individuals' subject-specific knowledge and skills together with soft skills such as critical thinking, reasoning, writing skills and other employability skills.

Method and Data

This paper discusses two methods to measure learning gain. The first method uses students' credentials, comparing their UCAS tariff points with their received class of degree. The second method contrasts the self-measured variables of written communication, spoken communication, numeracy skills, computer literacy and self-confidence from the application stage with the same variables measured during their last year in higher education. The results of this research will contribute to a discussion of the usability of these empirical methods for the TEF. It is necessary that means to measure students' Learning Gain for the TEF are feasible, valid and representable for all students. Also, it is critical that HEIs are not able to control the Learning Gains outcome.

There are system-immanent difficulties in both methods discussed. On one hand, credential data is censored as performances that are better than a 'first' cannot be measured. Self-assessed variables, on the other hand, will always be subjective and are expected to differ according to individuals' personality and their personal and HE-related circumstances such as gender and subject studied.

Nevertheless, students' Learning Gain was estimated using both methods and drawing in on data from a representative longitudinal survey (FUTURETRACK). Futuretrack covers the pathways from students' application to higher education in 2006 until their graduation in 2009/2010, and beyond (Purcell et al, 2013). The first aim of this paper is to find out if both methods to measure Learning Gain provide comparable outcomes. Using both methods, credentials and self-assessment, it will be possible to identify if students improved their skills during their time at higher education, and if both methods measure the same dimension of students learning. A second aim of the paper is to identify significant impacts on learning gain. Using ANOVA and regression analysis, it is possible to identify whether personal characteristics (gender, age, ethnicity etc.) and HE-related variables (subject studied, type of HEI, intensity studied) are significant enough to account for the variance in students' learning gain.

Initial Findings

Using the credentials of more than 7500 students, a scale of '0' to '13' was created where '0' indicates low or no learning gain and '13' indicates the highest learning gain. On average, students scored a 5.9 on this scale, with a variance of 4.1 (see Figure 1). This result shows that those students who enter higher education with a high level of tariff points were more likely to leave higher education with a higher class of degree. However, a large group of students also improved their position, i.e. they graduated with a better class of degree than expected on the basis of their tariff points ('positive learning gain'). In contrast, some started out with a higher level of tariff points but did not manage to add value during their studies ('negative learning gain').

Figure 1: Learning Gain measured using credentials

Source: Futuretrack 2006, UK graduates only, learning gain measured by contrasting class of degree with tariff points on entry, weighted

Data on self-assessed skills was available for 4800 students. Here, for each of the skills (written communication, spoken communication, numeracy skills, computer skills, and self-confidence) a scale from '-4' to '+4' was calculated where '-4' indicated that students rated themselves lower during their final year compared to their ratings during the application scale. A value of +4 shows that a student had regarded his or her skills as very low during the application stage and very high during the final year. Most students rated themselves similarly during the application stages and during their final year whilst some improved their skills (Figure 2). Some rated their skills lower or higher during their third year.

Figure 2: Learning Gain measured using students' self-assessment

Source: Futuretrack 2006, UK graduates only, learning gain measured by contrasting students' self-assessment in their final year with their self-assessment during the application, weighted.

A next step is to compare both methods and to look at their correlation (Table 1). A simple correlation was estimated using all six variables. Table 1 shows the Pearson's r coefficient, a measure of the linear [correlation](#). The Pearson's r is 1 if there is a positive correlation, 0 for no correlation, and -1 is a negative correlation. The coefficient (Pearson's r) is then tested using a simple significance test. If both methods had measured the same dimension of learning gain, Pearson's r would have been '1' or close to '1' in all of the cells. However, the results show that, especially between both methods 'credentials' and 'self-assessment', there is a negative correlation and the values are close to '0'. The results indicate that the two methods measure different dimensions of learning gain and that in written communication skills and numeracy skills there is a significant negative correlation. Pearson's r is positive and significant among the self-assessed variables. Students who were more likely to report an improvement in one kind of skill are also more likely to report an increase in a different skill which could indicate that this way of measuring 'learning gain' depends on individuals' personality rather than measuring students' intellectual development.

Table 1: Pearson's r, Correlations between different ways to measure Learning Gain

	Credentials	Written Communication Skills	Spoken Communication Skills	Numeracy Skills	Computer Skills	Self-Confidence
Credentials	1	-.086**	-0.027	-.105**	-0.032	-0.022
Written Communication Skills		1	.311**	.202**	.163**	.153**
Spoken Communication Skills			1	.188**	.156**	.331**
Numeracy Skills				1	.260**	.117**
Computer Skills					1	.194**
Self-Confidence						1

Source: Futuretrack 2006, UK graduates only, not weighted. ** Correlation is significant at the 0.01 level (2-tailed).

Interpretation

The paper presented two different methods based on students' credentials and their self-assessment. Two main results can be drawn from this research so far. First, both methods show that there is a lot of variation between the students. Second, both methods measure different dimensions of learning gain.

The full paper will also identify if there are significant influences to Learning Gain.

References

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