Feature

Course fees and academic ranking: insights from the IMI EMTRAIN on-course¹ database

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The Innovative Medicines Initiative (IMI) funded project on-course¹ (http://www.on-course.eu/) lists postgraduate biomedical courses in Europe and is comprehensive for all taught and research master's courses. Using on-course¹, new insights into education and training in Europe can be delivered; and here we investigate the relationship between master's course fees and university ranking. We hypothesise that higher master's course fees would be associated with higher university ranking. This was indeed the case for research master's courses and for taught master's courses for non-EU students. However, we observed no correlation between taught master's course fees for EU students and university ranking, meaning EU students are paying on average as much for courses at lower ranked universities as they are for courses at higher ranked universities.

Introduction

The Innovative Medicines Initiative (IMI; http://www.imi.europa.eu/) is a €2 billion joint undertaking for research between the EU and the European Federation of Pharmaceutical Industries and Associations (EFPIA). Its research agenda aims to overcome the principle causes of delay in pharmaceutical R&D by focusing on four areas, one of which is education and training. IMI supports the European Medicines Research Training Network (EMTRAIN) as a collaborative project with 12 academic and 16 industrial partners. EMTRAIN (http://www.emtrain.eu/) is preparing a sustainable, pan-European platform for education and training covering the whole lifecycle of medicines research, from basic science through to clinical development and pharmacovigilance. One of EMTRAIN’s actions has been to build an interactive online database called on-course¹ (http://www.on-course.eu/) to catalogue all EU postgraduate biomedical courses (i.e. continuing professional development (CPD), master's and PhD) [1]. Uniquely, the catalogue not only helps course seekers find an appropriate course but also provides data for research on cross-sectional and longitudinal trends in postgraduate course provision. on-course¹ is an integral part of an EMTRAIN-led work stream called LifeTrain that is helping to build a common European framework for mutual recognition of CPD in biomedical sciences [2].

Postgraduate biomedical education directly serves the dual societal purpose of creating specialist scientists (largely at the master’s and PhD level) and of extending and updating the competencies of existing scientists through their life-long continuing professional development. The master's degree is a major contributor in this specialisation process, yet postgraduate students can often lack the financial support offered by governments to undergraduate students thus making course fees an important consideration. In addition, the master's degree modules are increasingly being offered as stand-alone CPD courses. Therefore, the quality and the cost are important considerations for professional training. Examination of the on-course¹ database shows that course seekers are faced with a wide range of course fees within and between member states. It is possible that this wide range correlates with the actual variation in the quality of its provider, or the correlation might be with the provider's perception of the quality of its own courses. Alternatively, variation in fees can
reflect social and/or educational policy differences between providers and/or member states. Whatever the reasons for this wide range, the effect can be to bewilder the course-seeker.

on-course \textsuperscript{11} lists all biomedical master’s courses in Europe and thus offers a new level of transparency by enabling comprehensive comparisons of course details including CPD quality \cite{[3]}. Here, we compare data on course fees for biomedical master’s courses in EU member states with data on the European ranking of the institution providing the course using Webometrics Ranking (http://www.webometrics.info/). This comparison permits an initial test of the hypothesis that higher fees can correlate with higher ranking.

The IMI on-course \textsuperscript{10} database

The on-course \textsuperscript{10} database has been developed by EMTRAIN through a manual website search of over 1000 course providers in over 30 EU member and associated states. As of August 2013 it provided information on 992 PhDs and 1480 CPD courses and on 2360 courses leading to a master’s degree (of which 1951 courses are predominantly set in a teaching environment (taught courses) and 409 are predominantly set in a research environment (research courses)).

Master’s course fee information (updated between April and August 2013) held within on-course \textsuperscript{10} was available for 2204 courses captured from 370 universities in 30 countries. The full cost of the course (total cost from start to completion) was initially extracted from the course homepage or institute website. Where fees could not be located the course supervisor was contacted and asked for the information. Fees for 156 courses were not found on institute websites or provided by course supervisors. In August all currencies were standardised to Euro (€) using the XE currency converter (http://www.xe.com) for comparison purposes with fees for EU and non-EU students captured separately. Taught and research degree costs were also kept independent of one another owing to the higher charges associated with research degrees. Pairwise correlation, linear regression analysis and calculation of means were performed in Stata v13 (http://www.stata.com).

Databases for university rankings

There are currently five major university ranking systems used globally that comprise the Academic Ranking of World Universities (http://www.arwu.org), Times Higher Education World University Rankings (http://www.timeshighereducation.co.uk/world-university-rankings), Leiden Ranking by Centre for Science and Technology Studies (http://www.leidenranking.com), Quacquarelli Symonds World University Ranking (http://www.topuniversities.com/university-rankings) and Webometrics (http://www.webometrics.info/). Whereas we recognise that debate about the value and purpose of the various ranking systems is ongoing (http://www.universityworldnews.com/article.php?story=20130626160718267), we have considered that the debate might be enlightened if we identified the most suitable database for our purpose and if this then enabled us to draw conclusions on policy for reducing delays in pharmaceutical R&D. After weighting the merits of the various ranking systems we chose Webometrics Ranking. This system provided the most comprehensive list (over 21000) of ranked higher education institutions in the world and was the only ranking system that could be applied to every institute captured on on-course \textsuperscript{10}. By contrast, the other ranking systems mentioned above only listed the top 400–700 world universities, capturing only approximately one-third of universities listed on on-course \textsuperscript{10}. Webometrics

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{course_fees.png}
\caption{Course fees for non-EU students plotted against university rank. Scatter chart of taught master’s course fees (standardised to Euro) for non-EU students plotted against European university rank using the Webometrics ranking system (http://www.webometrics.info/). Linear regression analysis shows a significant association between fees and ranking ($P > 0.001$).}
\end{figure}
Ranking data have a moderate correlation with data from other ranking systems [4].

**Master’s course fee trends**

We investigated whether there was any correlation between master’s fees and university ranking. Our analysis looked at courses from 370 universities that Webometrics ranked in Europe between position 1 and position 2712. We observed a negative and significant (P > 0.001) correlation between research master’s course fees (398 courses) and university ranking for EU student fees (pair-wise correlation −0.37) and non-EU student fees (pair-wise correlation −0.52) where the top-ranking universities correlated with higher fees. We observed a similar significant trend for taught master’s fees (1723 courses) for non-EU student fees (pair-wise correlation −0.19) (Fig. 1). However, our results showed no significant correlation (P = 0.93; pair-wise correlation +0.0002) between university ranking and taught master’s course fees (1806 courses) offered to EU students (Fig. 2).

Wide inter-country course fee variation was also observed between the mean taught course fees for EU and non-EU students (Fig. 3). EU students were not required to pay course fees in Sweden and Finland with a further seven countries offering courses under €1000. Only four countries (Cyprus, UK, Ireland and Austria) charged EU students over €5000 for a complete course with Austria being the most expensive with a mean charge of €10,539. For students from outside the EU, courses under €1000 could be taken in six EU countries with a further ten countries offering courses under €5000. Although being among the cheapest for EU students, Sweden is the most expensive place to study for non-EU students with a mean course fee of €30,843. Inter-country variation in research master’s fees was not investigated because only six countries offered such courses and 86.4% of these courses were found in the UK. The mean course fee for a research master’s in the UK was €20,613 with a range of €11,150 to €38,000.

**Rankings are here to stay**

The latest data from The Complete University Guide shows that university rank is closely correlated with employment success of graduates upon completion of their course (http://www.thecompleteuniversityguide.co.uk). Likewise, the Times Higher Education European university ranking shows that better ranked universities deliver a better teaching and learning environment (http://www.timeshighereducation.co.uk). At a European level, the European University Association (EUA) recognises that rankings are increasingly being used for institutional strategic planning and on public policy making (http://www.eua.be/Libraries/Publications_homepage_list/EUA_Global_University_Rankings_and_Their_Impact_-_Report_II.ashx). Given these trends the question arises as to why on-course fees data show a lack of correlation between fees for EU students and university ranking. One of the contributing factors will be government imposed fee caps that restrict competition on price and force most institutes to charge the maximum they are allowed out of economic necessity, particularly because the cost of setting up and running a master’s course can be expensive with no guarantee of a profitable return. It is certainly fair

![Figure 2](https://www.drugdiscoverytoday.com)

**FIGURE 2**
Course fees for EU students plotted against university rank. Scatter chart of taught master’s course fees (standardised to Euro) for EU students plotted against European university rank using the Webometrics ranking system (http://www.webometrics.info/). Linear regression analysis shows no association between fees and ranking (P = 0.93).
However, the wider inter-country variation in course fees across Europe means that enhanced student mobility will benefit from a greater chance of finding reasonably priced courses at favourably ranked universities. There are of course other factors to consider such as whether or not the course delivers the competencies needed in the jobs market, whether the scientific area is of interest to the student, how well the student will cope studying abroad and whether scholarship opportunities are available. However, the number of courses offering similar content in Europe is often large and for those who do not mind travelling this boils the choice down to the principle components of cost, quality and career prospects.

Concluding remarks

The pharmaceutical industry is among the top performing high technology sectors in Europe (http://www.efpia.eu/uploads/Figures_Key_Data_2013.pdf). The master’s degree and associated CPD training are pivotal instruments in developing specialised scientists for this industry and yet funding limitations and a lack of transparency concerning the courses that are on offer and the fees they charge are reducing the effectiveness of this process in Europe. The IMI on-course$^\text{a}$ catalogue reveals the best opportunities for course seekers and will hopefully encourage universities to offer even greater value in terms of content, quality and cost. The increasing challenges of education and training in a rapidly changing environment, and the need for industry, universities and other partners to collaborate to address these, are described in the Strategic Research Agenda for IMI-2 (http://www.imi.europa.eu/content/documents/horizon_2020). on-course$^\text{a}$ will also prove to be an invaluable tool that will allow biomedical postgraduate trends in Europe (cross-sectional and longitudinal) to be followed and influenced to improve Europe’s competitive position. If you would like to express and share your views on master’s course fees in Europe then please register for free on the on-course$^\text{a}$ website (http://www.on-course.eu/) and join in the discussions on our forum.

References


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