

The Unspent Resource

Industrial Adjunct Professors as a Potential Source for Developing Engineering Curricula

P Fagrell¹

Senior advisor/PhD Student
Teknikföretagen/KTH Royal Institute of Technology
Stockholm, Sweden
E-mail: perfag@kth.se

L Geschwind

Associate professor
KTH Royal Institute of Technology
Stockholm, Sweden
E-mail: larsges@kth.se

A Jörnesten

Deputy head of Operations/Adjunct faculty
KK-stiftelsen/KTH Royal Institute of Technology
Stockholm, Sweden
E-mail: anders.jornesten@kks.se

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INTRODUCTION

This paper presents the findings from a study with industrial adjunct professors at two higher education institutions in Sweden. The aim of the study was to investigate if adjunct professors can be used as a strategic resource for developing engineering curricula. The paper also investigates their balance of work and their preferences and possible intentions to change the balance to more education, i.e. development of engineering curricula, at bachelor and master level. The paper is a follow-up from a pilot study presented at the SEFI conference 2014 in Birmingham [1].

¹Corresponding Author
P Fagrell
perfag@kth.se

1 BACKGROUND

1.1 The history of adjunct professors in Sweden

The adjunct professor was introduced to the Swedish academic system in 1983. The introduction was preceded by many years of investigations, surveys, proposals and even a try-out period. Two Swedish Government Official Reports in the 1950s and 1960s [2, 3] anticipated an expansion of the higher education system in Sweden. But they also stated that this expansion would be very difficult to implement with the material resources and personal resources at hand. Postgraduate education was pointed out as a key for a successful expansion, and in order to do an inventory of possible extra resources for postgraduate supervising outside academia a survey was conducted with around 75 companies and research institutes. The results from the survey showed that suitable personal resources outside academia were available to a “considerable extent” and, if used, could allow an expansion of higher education in Sweden [4]. It was proposed that these external resources could be transformed into the academic system by experienced researchers outside academia who would be part-time employed by the universities. The competence requirements would be the same as for a full professor and the title, during the proposed limited assignment time, would be professor [5]. In the mid-70s the adjunct professor was first introduced on a try-out basis, and from 1983 on a regular basis.

The function and role of the adjunct professor was inspired by a similar system in the Netherlands. A fruitful cooperation between technical universities/polytechnics and industries with advanced research had been developed and one important part of this cooperation was that experienced researchers from industry spent a part of their time at a university [4].

1.2 The role and function of adjunct professors in Sweden today

The areas of medicine & health and engineering science have already from the beginning been dominating the numbers of adjunct professors [4]. Today there is approximately 550-600 adjunct professors in Sweden [6, 7]. Of those, nearly 300 are adjunct professors in the area of natural & engineering science, see *Fig. 1*. As a comparison, there are around 5 000 full time professors at Swedish higher education institutions [8].

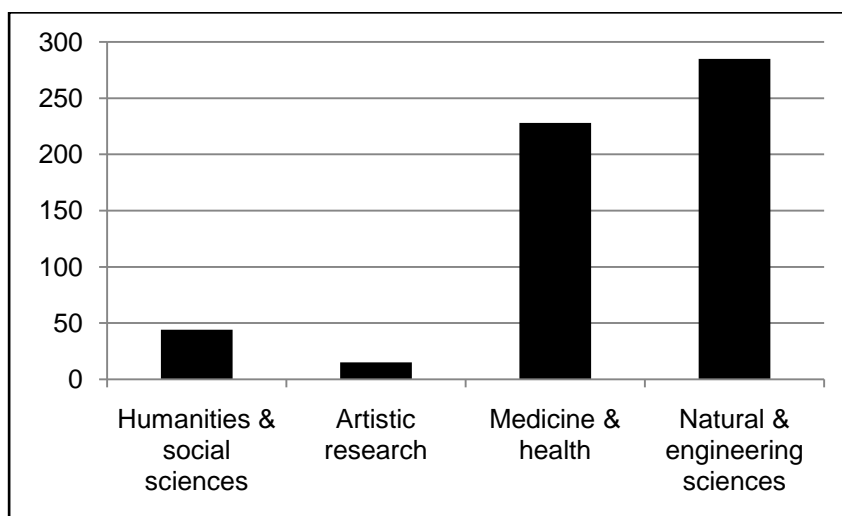


Fig. 1. The numbers of adjunct professors at Swedish higher education institutions per area of science [7]

An adjunct professor is appointed and employed by the university for a limited period of time, not to exceed twelve years [9]. Normally the university does not pay any salary to the adjunct professor; the ordinary employer continues to pay full salary. This is essentially how the function of adjunct professor is financed.

The time spent at the university differs for adjunct professors, but is usually between 20 and 50 percent, typically 20 percent, i.e. one day a week. Having said that, an adjunct professor appointed for a period of three years, which seems to be a standard for the first tenure, would contribute to the university's resources with 0,6 man-year.

1.3 Adjunct professors as a way to transfer knowledge

In an earlier study [10] of adjunct professors at KTH, the adjunct professors' ordinary employers stated three main reasons why these highly qualified persons should spend a part of their work time at a university.

In short these reasons are:

- Increasing capacity: the collaboration gives the organization a stronger base for revivification and innovation through the academic network made available.
- Increasing competence: the collaboration helps the organization to keep and develop key employees and to get valuable connections with the future work force.
- Increasing knowledge: the collaboration facilitates knowledge transfer that helps ongoing or future innovation projects.

The first and the third reason have obvious connections to the organisations own research and innovation, while the second reason has a more distinct connection to the education at the university. However, the companies which employ engineers express difficulties in how to influence the engineering education curriculum [11].

During the last years many universities seem to have recognised mobility of personnel as a way to increase knowledge transfer between academia and the surrounding society. Some universities have developed strategies addressing how this kind of collaboration and cooperation could strengthen the university. According to Clark's concept of the 'entrepreneurial university' [12], adjunct professors could be seen as a way for universities to reach out to organisations outside its own sector and also to facilitate a diversified funding base, two of Clarks requirements to become an entrepreneurial university.

Knowledge transfer and mobility of personnel is often discussed from the universities' point of view, with the assumption that all knowledge is 'produced' at the universities and has to be transferred out to the society, not the other way around. This is called Mode 1 by Gibbons et al [13]. However, in Mode 2 it is rather referred to as technology interchange, instead of transfer. This interchange represents an interactive process between various stakeholders such as university, engineers in business, capitalists, patent attorneys and so forth [13]. This study takes its standpoint in that mobility of personnel in the form of adjunct professors is one way of enhancing the interchange of knowledge between academia and industry.

1.4 Educational collaboration

In Lars Bengtsson's research review about educational collaboration [14] he concludes that the universities education is more valuable to the society than the

research that is carried out. This is due to the well-educated students coming out from the universities and thus increasing the society's competitiveness and innovativeness [15].

Bengtsson describes a useful categorisation of different types of educational collaborations, derived from a Norwegian report [16]. Three types of educational collaborations, in part overlapping each other, are described:

- Collaboration with the aim to create or develop new educations.
- Collaboration with the aim to be a part in the teaching and learning process.
- Collaboration with the aim to ease students' transfer from education to working life.

This study focus on the first of the three categories of educational collaboration, although all three have been touched upon in many of the interviews. The model with the three categories has helped the analysis of the collected data.

1.5 Academic drift

'Academic drift' has been used to describe a process where knowledge which is intended to be useful gradually loses its ties to practice and becomes more integrated with scientific knowledge [17]. Sometimes academic drift is analysed through external stakeholder's view on graduated students from a certain type of education. Sometimes it is analysed through faculty staff's desire to become more research oriented, thus gaining points in an academic qualification race [18]. The original main purpose of the adjunct professor – to strengthen the postgraduate education – seems to have drifted away towards more research already during the try-out time in the mid 70's [4]. This implicates an academic drift of the adjunct professor, even before it was decided to implement the function on a regular basis in 1983. But what has happened since then? There seems to be no recent study on how adjunct professors in Sweden spend their time at their university.

2 METHOD

2.1 Purpose and aim of the study

The purpose of the study is to investigate how adjunct professors can be used as a potential strategic resource for developing the engineering curricula in cooperation with industry. The study also highlights the individual perspective such as the balance of work for adjunct professors and their preferences and possible intentions to change the balance to more education, i.e. development of engineering curricula, at bachelor and master level. Having said that, the interest and the intention of stakeholders at hand, i.e. the ordinary employer and the university is of interest for the study. The main research questions to be answered are:

- How do external stakeholders on the one hand and universities on the other hand see adjunct professors as possible change agents in developing engineering curricula?
- What role in developing engineering curricula do adjunct professors have today?

2.2 Method

The study is a two case study containing 31 semi-structured interviews. The choice of sample for the study was made in two steps. First, two higher education institutions (HEI) were chosen who have actively worked with affiliated faculty. The

purpose with the two cases was both to enable comparison and to differentiate between interviews from the two HEIs. Second, we selected adjunct professors at the chosen HEIs to interview. Furthermore, as an extra factor in the choice of data sample, the companies and organizations where the adjunct professors have their main employment is of interest to interview.

The choice of universities in the study was made by a purposeful sample [19]. The last few years KTH Royal Institute of Technology in Stockholm has upgraded its collaboration with the surrounding community and the “function” adjunct professors is an important part of this strategy. KTH could arguably be described as best practice in Sweden for this kind of collaboration.

Mälardalen University (MdH) would like to be renowned as a university college who thrives through close cooperation with the surrounding community, labelling itself as ‘the coproducing university’. As a relatively small, but growing, university college they use part-time employments, for example in cooperation with companies, as a way to build and expand their research and education.

As a bonus, there are companies collaborating with both KTH and MdH, which makes it even more interesting to select these two universities for this study. Persons involved in these collaborations are included in the study. To sum up, 31 interviews were made with HEI management, adjunct professors and their ordinary employer. All informants in the study can be said to be leading persons within their respective field and function, hence the interviews should be considered as elite interviews [20]. It also justifies the initial literature review of both research and policy documents as a way to build the prior understanding necessary for elite interviews.

The data collection was made through semi-structured elite interviews [19, 20]. Themes in the interviews were for example:

- expectations from the stakeholders on the adjunct professor
- expectations from the adjunct professor himself
- the actual work situation for the adjunct professor
- the interest or intention to work with developing engineering curriculum.

The interviews have been transcribed and analysed with respect to its content. The content analysis aims to find a meaning and a pattern in what has been said in the interviews [21], rather than a focus on the language. All citations that follow are translations made by the authors from the transcribed interviews.

3 RESULTS AND DISCUSSION

3.1 Expectations

One interesting theme in the interviews is expectations. Expectations from the university on how it wants the adjunct professor to contribute. Expectations from the company on what it wants the adjunct professor to bring back from the university. And last but not least, the expectations from the adjunct professor. A first striking conclusion about expectations is that the three stakeholders; the HEI, the company and the adjunct professor, very seldom have a written agreement about the expectations. In fact, they have very seldom even talked about it before the assignment as an adjunct professor. But they can all express some expectations in the interviews and the second conclusion is that the expectations differs a lot.

The HEI managements have no specific expectations on the adjunct professors. They see the adjunct professors has good ways to establish and grow collaborations with the surrounding society and thus bring in new ideas, new contacts and hopefully new funding. A little bit of everything with no “grand plan” essentially, which is very much confirmed by the following:

“There was no specific mission, but I rather think that I was supposed to understand what to do. Supervising master thesis, supervising postgraduate students, come up with some ideas, join a few project, well, like – a little bit of this and a little bit of that.”

From the HEI side, this could be representative:

“I think they are very good ambassadors (for the HEI) who spread our good brand.”

When the HEIs talk about expectations they most often talk about it in terms of research, never in terms of education. This is in stark contrast to the companies. The companies are very clear that it is the education and its students that is in focus. Several of the interviewed companies pronounce this clearly and numerous adjunct professors bring with them an implicit or explicit mandate to establish contacts with the best students for future recruitment. An adjunct professor says:

“Actually I had two things. I felt that one mission [from the company] was to increase the interactions [with the HEI]. Identify good students, facilitate master thesis and so on, I felt that clearly. I think that’s a clear mission with the affiliated function. Then, more personally, I really wanted to get more time to think, to think on a longer term. For me, honestly, this is a breathing space.”

The adjunct professors’ own expectations of what the appointment should mean are of course very different, but a common thing for many, regardless of HEI, is an expectation to be able to get deeper in to subjects they do not have time for on their ordinary work. The appointment as an adjunct professor is an opportunity to develop and improve their skills, and as seen in the quote above, to immerse themselves or to gain a new perspective on their ordinary work. It provides an opportunity to stop and think on a more long term basis. They also emphasize the intellectual stimulation and satisfaction of having one foot in the academy, and an obligation to act as a messenger of both industrial and academic needs.

Can these different expectations ever meet? Perhaps they already are met? The university gets a person who can contribute with a little bit of everything depending on a combination of what is needed at the moment and the competence and capacity of the adjunct professor. The company gets a deepened collaboration with the university and hopefully along the way, a closer relation to their future work force, the engineers. And the adjunct professor seems to be able to manage all this. As a token he gets a breathing space, and perhaps even a competence and confidence boost. But it would probably not hurt if the expectations were pronounced clearer from the beginning.

3.2 Actual work situation

In the discussions on how the adjunct professors actually spend their time at the HEIs there emerges primarily two different tracks. A large part of the adjunct professors are involved in academic core business; they are at the same time a researcher, supervisor and teacher. However, this is not the only role that emerges. Several adjunct professors also describe their role as facilitators, door openers or

contact intermediaries. In particular, this applies to adjunct professors with a management position in their organizations.

The adjunct professors' assignments are many and their role can be seen as fragmented. However, the interviewees were usually very satisfied with their situation, even if they have a very limited time at the university to manage all their duties. Naturally, this requires careful planning and sometimes harsh priorities. As a natural consequence of the often unspoken expectations described above, the role of the adjunct professors have usually grown with time. An adjunct professor says the following about his assignments:

"It has become what it is today more or less by a day-by-day development, it wasn't set from the beginning. I am satisfied with the assignments I have and can control them pretty well myself. "

There are high aspirations about what to do with the (limited) time as adjunct professor and there is rather a cut down on the aspirations along the road. Again, a certain formalization of the expectations would probably help all three parties to see what the assignment will mean. However, there is a balance between what a top-down formulated expectation entails and what the perceived satisfaction as a responsibility over the work situation obviously entails.

3.3 The role in education

The vast majority of the adjunct professors are involved in education to some extent. Most common are guest lectures, where the mission is to provide subject-related input, but a touch of the life after graduation seems equally important. Adjunct professors are also supervising and facilitating master theses and so forth. The limited time as an adjunct visiting professor sets the limit to this commitment in education. A few adjunct professors in this study express an interest in being more involved in education in the form of course responsibility and the like, but the vast majority do not see that the time would suffice for a greater commitment.

One or two interviewees at KTH have been involved in developing courses and/or programs. But overall, neither at KTH or MDH, there is a great interest (or ability) to reprioritize their existing duties to include more of for example development of curricula.

The single exception is at MdH in the form of an adjunct professor whose special mission is to develop a new program at master level. MdH is thus perhaps the first higher education institution in Sweden that has hired an adjunct professor with a clear focus to develop engineering curricula.

Interestingly enough, neither HEI, with the above mentioned exception, can see a role for the adjunct professors in developing engineering curricula. The companies would very much like to influence the education and see the adjunct professor as one way of doing it, but more through the normal 'production', i.e. researching, supervising and teaching, not in developing curricula. A conclusion is that the HEIs do not see adjunct professors as a strategic resource for developing engineering curriculum.

All in all we conclude that the adjunct professors represent a resource which is expended but perhaps not expediently spent due to stakeholders' different expectations.

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