

FACULTY AWARENESS OF WORKING LIFE ISSUES

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ABSTRACT

The aim of this paper is to study academic staff's knowledge about working life outside academia and how contacts with employers and work related learning are integrated in higher education. This is the first research report from the project Science and Technology in Society, funded by the European Social fund (2012-2014), which aims at increasing faculty awareness of working life issues at the Royal Institute of Technology (KTH) and Stockholm University, the Faculty of Science (SU). In this paper, we examine the academic staff's relation to working life outside academia in terms of their own work experience outside academia, their knowledge about the world of work for students and their opinion on the need for work related learning. The results indicate that there are some differences, e.g. academic staff at KTH seem to have more work experience outside academia and they have integrated more work related learning than academic staff at SU, while staff at SU to a higher extent seem to think there is a need for an increase of work related activities. The tentative conclusions are that an increase in commitment from and partnerships with employers as well as opportunities for academic staff to spend time in workplaces outside academia could increase work related learning in engineering education as well as in science education.

KEYWORDS

Engineering Education, Science Education, Work Related Learning, Working Life Outside Academia, Faculty Development.

INTRODUCTION

From several different actors, there are requests for an increase of work related learning in higher education. These actors are both national and international. In Swedish as in European higher education, fuelled by the Bologna process, employability has become a priority across disciplines and higher education institutions [1]. The demands also emanate from both within and outside academia. Within universities, the faculties stipulate such requirements in policies and activity plans, and students also have similar demands. Even though the CDIO initiative has been very influential in engineering education, there are studies, for instance from KTH showing that students still lack knowledge about the future working life. Student and alumni surveys suggest that this gap between higher education and the working life continues throughout the education and not only during the first years [2]. There are also a number of studies from other countries showing similar results [3].

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On a national level, The Swedish National Audit Office, among others, have recently examined what universities do to support student employability and one of the conclusions was that many educational programmes lack procedures that secure connections to working life outside academia [4]. Additionally, employers express a need for more work related learning in educational programmes [5]. Another policy initiative, “the Knowledge Triangle”, highlights the need to collaborate with different actors outside academia, in order to foster innovation and entrepreneurship [6].

To meet the demand for stronger links between academia and the world of work, a joint project with two universities in Stockholm has been initiated. The project, called Science and Technology in Society, is funded by the European Social fund (2012-2014). The project aims at increasing faculty awareness of working life issues at KTH and Stockholm University, the Faculty of Science (SU), and investigates academics’ ability and capacity to act as well as the room for maneuver in terms of working conditions, support and incentives.

During the project, research will also be conducted, and since the project aims at increasing faculty awareness of working life issues, a relevant starting point was to examine the current awareness among staff at both universities. Due to this aim, we will examine the following research question: What is academic staff’s relation to working life outside academia in terms of their own work experience outside academia, their knowledge about the world of work for students and their opinion on the need for work related learning? Another question regards which differences, if any, there are between the two universities. In the paper, we will also investigate how many external contacts academic staff have interacted with in their teaching, what kind of work related learning activities that are integrated and what kind of activities academic staff would like to offer.

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CONTEXT

Higher Education in Sweden

Higher education in Sweden is conducted in first cycle (bachelor/undergraduate), second cycle (master) and third cycle (doctoral) programmes. Students can apply to full study programmes, some of which lead to professional or vocational qualifications. In addition to study programmes, students can also study self-contained courses which also can lead to a degree. The Swedish Government has the primary responsibility for higher education, but the higher education institutions are to a large extent free to make their own decisions, e.g. about the content and design of courses and study programmes. According to the Swedish Higher Education Act, higher education institutions are obliged to interact with the surrounding society [7].

KTH Royal Institute of Technology

KTH Royal Institute of Technology is the largest technical university in Sweden and one-third of Sweden’s technical research and engineering education capacity at university level is provided by KTH [8]. At KTH, the academic staff consists of 2 900 employees, including lecturers, assistant professors, associate professors, post docs, researchers, professors, and doctoral students. There are about 100 first and second cycle educational programmes, mainly

professional programmes in engineering. There are approximately 14 000 undergraduate students at KTH.

At KTH, preparation for future professional work is mentioned in development plans, both in previous plans and in the new plan for 2013-2016 [9]. The new plan states that “students need to practice open ended tasks and concrete applications, preferably in cooperation with society/industry” and “the educational programs have to be characterized by relevant contact with society”.

The Faculty of Science, Stockholm University

The Faculty of Science at Stockholm University, SU, is the largest science faculty in Sweden [10]. The academic staff consists of 1 300 employees. There are approximately 70 first and second cycle programmes and a large number of self-contained courses. At the Faculty of Science, there are 4 000 undergraduate students.

In SU's activity plan one of the focus areas is liaison and cooperation with society [11]. For instance, the plan states that “the University has to a greater extent than before encourage students' transition to work life by increasing their contacts with industry, the public sector and associations during their education” and furthermore: “the University will work for an increase in external work placement during training” and also for offering “good opportunities for students to do their theses outside academia.”

BACKGROUND

Work Related Learning in Higher Education

There has been a debate whether higher education should prepare students for their future occupation or not. More specifically, the debate regards to what extent higher education should directly prepare students for a future professional role and aim at preparation for the world of work or rather lay the foundation and focus on knowledge without having possible future professional roles in mind [12]. Nevertheless, preparation for the world of work and employability has become a priority in many higher education institutions. Employability is often understood as the ability to get a job after graduation or as a set of skills [13]. Knight and Yorke [13] suggest that there is something more to it and stipulate that employability “consists of making convincing claims in four areas: Understanding (propositional knowledge), Skillful practices (procedural knowledge), Efficacy beliefs (belief that one can make impact on situations), and Metacognition (awareness of what one knows and can do)”. Employability can be enhanced in several ways during the whole period of education, preferably by programme-wide activities. Such learning activities are designed for students to learn knowledge and skills that are of value in the world of work and these activities can be called work related learning [13].

Work related learning activities can also be defined as “learning activities through which students experience activities which are based on, or derive from, the context of work or the workplace” [14]. Such activities can be work-based (at a workplace), non-work-based (not located at a workplace) and also overlapping. Work-based activities include e.g. part time employment, voluntary work, placements and projects. Non-work-based activities include e.g. case studies, role play, scenarios and projects. When it comes to the design of work related learning activities, Hills et al [14] suggest to start with identifying learning outcomes in terms of those skills that employers demand as well as required knowledge and understanding. However, higher

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education institutions must not meet these expectations uncritically. Teichler [15] stipulates that “higher education has to translate the expectations raised from outside and define its own proactive role with regards to job tasks and employment patterns”.

In Science education, there is a tradition of focusing on disciplinary knowledge and the pure science discipline is more atomistic and discovery oriented [16]. The engineering discipline, on the other hand, is more pragmatic and purposive. Nevertheless, engineering education has since the 1960s become less practice-based and more focused on the teaching of theory, e.g. science and mathematics [17]. The CDIO Initiative is a reaction to this change and aims at putting more emphasis on the skills students’ need to be able to work as engineers, but still maintaining the fundamentals. In the CDIO approach, an increase in active and experiential learning is recommended. In active learning “students are more involved in manipulating, applying, and evaluating ideas” and “active learning becomes experiential when students take on roles that simulate professional engineering practice”, which can happen in e.g. projects and case studies [17]. In experiential learning there are also transactions between the student and the real-world involved. The CDIO approach also advocates integrated learning experiences which means that students learn skills and disciplinary knowledge in an engineering context, which in turn prepare students for the engineering profession [18]. These examples indicate that the CDIO approach requires an integration of work related learning to prepare students for the practice.

Possibly it could be rather difficult for staff that by and large are focused on teaching theory in science and mathematics to integrate work related learning in their teaching. When Boden [19] describes how to adopt and implement the CDIO strategy, several examples of actions focusing on enhancing faculty and teaching staff’s competence are mentioned. One suggestion is to offer faculty and teaching staff a possibility to work in industry and another is to arrange partnerships with industry in education projects.

METHODOLOGY

Prior to the start of the project Science and Technology in Society, 14 workshops were conducted, eight at KTH and six at SU. In some cases, staff were invited separately, and in other cases the workshops took place during regular meetings at e.g. departments. Consequently, some participants volunteered, and some took part more or less involuntary. The aim of the workshops was to get an understanding of academic staff’s opinion about the issues and scope of the project. The main question was about the challenges staff meet and anticipate when it comes to faculty development and integration of work related learning. Academic staff could also suggest project activities. Notes were taken during the workshops. For the purpose of this paper, we based the analysis on three questions, namely opinions on the needs, incentives and work related learning activities.

Questionnaires were also sent out prior to the start of the project. The questionnaires were sent to all academic staff at KTH (2 900 recipients) and SU (1 300 recipients). There were two different questionnaires, one to management staff, e.g. deans, heads of undergraduate studies, etc., and one to academic staff in general, e.g. lecturers, post docs, professors etc. To some extent, the questions and the response options differed between SU and KTH, which means there were four different questionnaires sent out. Prior to the distribution of the questionnaires, a pilot was conducted. In a number of questions, we chose to use six point rating scales. Since people tend to avoid the extremes and tend to choose the mid-point [20], we decided to offer a larger scale than e.g. a four or five point scale with no middle point. Another reason for using a

larger scale was to prepare for the follow-up questionnaire when we want to measure continuity or change regarding the variables in question. The response rates were as follows: KTH management 34%; KTH staff 30%; SU management 44%; and SU staff 13%.

FINDINGS

Experience and awareness

One of the questions in the questionnaires focused on work experience outside the academia. Both management and academic staff were asked how many of the last ten years they have worked outside academia in a profession related to their current field, as showed in Table 1.

Table 1. Work experience outside the academia

Number of years	KTH		SU	
	Management	Academic staff	Management	Academic staff
Not at all	48%	48%	80%	64%
-1 year	25%	22%	11%	13%
2-3 years	11%	13%	7%	11%
4-5 years	7%	7%	0%	2%
6-10 years	9%	10%	2%	10%

This indicates that academic staff and management at KTH have more work experience outside academia than academic staff and management at SU.

Regarding academic staff's opinion on whether there is a need for work related learning, there were discussions during the workshops: *"There is some resistance among teachers to integrate work related learning in to the education."* *"Sometimes there is a belief that the quality will be reduced if you meet demands from working life."* *"You focus on the knowledge, not on what the students need as professionals"* (SU). *"There is no lack of interest, but we cannot give this priority"* (KTH).

In the questionnaires, there were questions regarding the academic staff's opinion on integrating work related issues in their teaching. On a six-grade scale (1=I am not interested, 6=I am very interested) staff replied as showed in Table 2. The interest among staff to include job market related issues in teaching seems to be rather high at both KTH and SU, slightly higher at KTH.

Table 2. Viewpoint on including job market related issues in teaching

	1= I am not interested	2	3	4	5	6=I am very interested	Median
KTH Academic staff	3%	7%	13%	20%	31%	27%	5
SU Academic staff	4%	12%	15%	21%	24%	23%	4

Academic staff at KTH and SU were also asked if they think there is a need for an increase of labour market related activities in their teaching, as showed in Table 3. A majority of the respondents seem to think there is a need for an increase, even though one fifth of KTH staff seem to have the impression that it is enough already. Rather few seem to think it is not needed at all.

Table 3. Need for an increase of labor market related activities in their teaching

	KTH Academic staff	SU Academic staff
Yes, very much	23%	29%
Yes, to some extent	53%	55%
No, there is enough already	19%	7%
No, it is not needed	5%	9%

Another question regarded academic staff's awareness of the world of work outside academia when it comes to the students' future employment. The question was "How would you rate your knowledge of today's job market outside academia? The question refers to your students' future employment with a relevant employer". On a six-grade scale (1=no knowledge, 6=very strong knowledge) staff replied as showed in Table 4. It seems as if staff at both universities rate their knowledge almost equally.

Table 4. Academic staff awareness of the world of work as regards the students' future employment (percentiles 25, 50 and 75)

	KTH Academic staff			SU Academic staff		
	P25	P50	P75	P25	P50	P75
Relevant employers	3	4	5	3	4	5
Employers' skill requirements	3	4	5	2	3,5	4
Tasks students may perform	3	4	5	3	4	5
New technology used in workplaces	3	4	5	2	3	4
Career paths at relevant employers	2	3	4	2	3	4

Incentives

Regarding incentives, 86% of KTH management thought there is a need for additional incentives. At SU, 97% of the management thought there is a need for additional incentives. Among ten different alternatives, the recipients graded the following factors on a six-grade scale (1=not important, 6=very important), as shown in Table 5. Management were asked which factors they think would make teachers give job market relations a higher priority, and academic staff were asked which factors that would make them give it a higher priority.

Table 5. Incentives that would give work related learning a higher priority (percentiles 25, 50 and 75)

	KTH						SU					
	Management			Academic staff			Management			Academic staff		
	P25	P50	P75	P25	P50	P75	P25	P50	P75	P25	P50	P75
Commitment from employers	4	5	6	4	5	5	4	5	5	4	5	6
Awareness of the need	4	5	6	3	4	5	4	5	6	3	3	5
Time to work on labour market relations	4	5	6	3	4	5	4	5	6	3	4	5
Academic qualification system where labour market experiences are regarded	3	5	6	3	4	5	3	5	6	3	4	5

Partnerships with employers	3	4,5	6	4	5	5	4	5	5	3	4	6
Demand from the students	4	4	5	4	5	5	4	5	5	3	4	5
Pedagogical tools and concepts	3	4	5	3	4	5	3	4	4	3	4	5
Directives from the management	2	3	5	2	3	4	3	4	5	2	3	4

The results in Table 5 indicate that both management and academic staff at KTH and SU thought partnerships with employers and commitment from employers would be a reinforcing factor when it comes to giving work related learning a higher priority. The question of commitment from employers was also discussed during one of the workshops: *“The most difficult part of my project course is to find companies that can offer us projects.”* *“Employers say they want to help, but it is difficult to get in touch with them”* (KTH). It seems as if management at both KTH and SU, to a higher extent than academic staff, thought that time to work on labor market relations and an increase in awareness would give these issues a higher priority. It also seems as if management at both universities, and staff at KTH, thought that a demand from students would make teachers give work related learning a higher priority.

Incentives were also discussed during the workshops: *“There is also a conception that researchers should ‘buy themselves free’ from teaching.”* *“For teaching staff, there are no incentives from the faculty to integrate work related learning.”* (KTH)

Activities

Academic staff were asked to what extent, during the last year, they have included job market experiences/issues in their teaching, as showed in Table 6. There was a six-grade scale (1=never, 6=very often). The results show that there are slightly more activities related to working life in teaching at KTH than at SU, e.g. examples from own work experience, case studies, guest lecturers and degree projects. Other activities the respondents at KTH offer are: *introducing students to employers, letting students conduct interviews with engineers and helping students with job applications.* At SU, *placements* are also offered according to the respondents.

Table 6. Activities related to working life integrated in their teaching

	KTH Academic staff			SU Academic staff		
	1=never	6=very often	Median	1=never	6=very often	Median
Examples from your own work experience	27%	14%	3	38%	8%	2
Case studies	29%	12%	3	48%	7%	2
Guest lecturers	36%	13%	3	61%	4%	1
Study visits	48%	5%	2	72%	2%	1
Projects with external organisations	46%	8%	2	75%	4%	1
Degree projects/theses	35%	15%	3	67%	4%	1

During the workshops, academic staff could suggest work related activities for students and examples from both KTH and SU are: *invite practitioners to meet students, seminars and workshops with employers for staff and students, internships and joint projects.* Staff could also

suggest activities for staff to improve their own knowledge about the world of work and presumably give them more contacts outside academia. Examples of suggestions from both universities are: *mentorship for staff, work place visits, staff placement in private or public sector, invite staff to career fairs, networks for staff and employers, events with alumni, staff working in external projects, and resources to develop educational programmes in cooperation with employers.*

Another question regarded how many contacts the academic staff have had during the previous year with entrepreneurs, employers or employees from private or public sector in their teaching. The results, as showed in Table 7, indicate that academic staff at KTH have interacted more with external contacts.

Table 7. Number of contacts from private or public sector used within their teaching

	0	1	2	3	4-	Mean
KTH Academic staff	34%	13%	12%	7%	35%	3
SU Academic staff	52%	9%	21%	3%	14%	2,2

CONCLUDING DISCUSSION

The tentative results show that management at both universities seem to think that a reinforcement of teachers' awareness of the need for work related learning would make teachers give the issue a higher priority, but the academic staff themselves do not seem to give this factor the same importance. To them, it seems as if it rather is a question of getting contacts with employers established. Boden [19] recommends partnerships with employers, which along with commitment from employers is requested among academic staff and is seen as an incentive that would make them give work related issues a higher priority. More input from the world of work would possibly make it easier for academic staff to design work related learning activities, since they would learn more about what is valued in terms of knowledge and skills. Thus, academic staff request commitment from employers and, as described earlier, employers in turn demand an increase in work related learning in higher education. To accomplish this, employers and academia would need to cooperate on how to integrate work related learning, however academia have to define their own role when cooperating in e.g. partnerships and not uncritically meet the employers' expectations [15].

According to Teichler [12] there has been a discussion on whether there is a need for preparing students for a future profession or not. Most of the academic staff at KTH and SU seem to think there is a need, so most of them seem to agree with policies as Bologna and the local activity plans and development plans. The opinion on including job market related issues in their teaching seems to be rather positive among academic staff both at KTH and SU. Efforts from management should probably focus on other issues than discussing the need for work related learning and instead focus on more concrete aspects such as to establish partnerships with industry.

Regarding work experiences outside academia, it has been suggested that teaching staff should be offered a possibility to work outside academia [19]. It seems as if there is a need for this, at both universities, even though academic staff at KTH seem to have more work experience outside academia. At KTH, there is an on-going discussion regarding the need for exchange between the faculty and the industry; one suggestion that has been discussed is to start a mentoring programme in which academic staff have staff from industry as mentors.

Another issue that seems to have an impact on whether academic staff will give the world of work a higher priority in their teaching is if there is a demand from students. At least at KTH, students do ask for more work related learning [2], which means this demand is already a fact.

The tentative results show that there are some differences between KTH and SU regarding issues related to the world of work. It seems as if academic staff at KTH have more work experience, are slightly more positive to integrate work related learning, offer work related activities to a slightly higher extent and have interacted more with external contacts in their teaching, than staff at SU, while staff at SU to a higher extent seem to think there is a need for an increase of work related activities. Academic staff at KTH seem to think there is already enough of work related activities in their teaching to a larger extent than staff at SU, which might indicate that work related learning is integrated to a higher extent at KTH than at SU. Still it seems as if a majority at both universities think an increase of work related learning is needed.

The differences found might possibly be explained by differences between engineering education and science education as such, or between full study programmes and self-contained courses, or between a professional discipline and a pure science discipline, which are areas for further research. The next step of the research in the project Science and Technology in Society will be to conduct interviews with both management and academic staff to in depth examine e.g. roles and responsibilities, organizational issues and the room for maneuver in terms of working conditions, support and incentives. Findings regarding responsibilities and organizational issues will be presented in a forthcoming paper. Further on, we will also conduct interviews with students at both universities to examine e.g. how they experience work related learning.

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