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COLLABORATIVE STUDENT CENTRED LEARNING – INTELLECTUAL PROPERTY FOR PRODUCT DESIGNERS

Dr Tania Humphries-Smith
Associate Dean (Technology & Design) in the School of Design, Engineering & Computing, Bournemouth University

ABSTRACT
This paper fits into the topics of student centred learning and learning spaces and explores the question - How will the academic/industrial interface develop?

At least a basic understanding of intellectual property (IP) rights is essential for practice as a professional engineer and/or designer to ensure commercial success. Yet it is recognised that there are barriers to incorporating learning and teaching of IP within the Higher Education design and engineering curriculum. These barriers include an already 'over-packed' curriculum and no established pedagogy.

This paper reports on an example of collaborative student centred learning activity between BA/BSc Product Design (PD) and LLB Law (Intellectual Property Practice option) (LLB) final year students at Bournemouth University (BU). The final year product design students are required to design and produce a working prototype of a marketable product. The LLB students advise on the intellectual property aspects of the design. This learning activity has been ongoing for a number of years, however, last academic year changes were made to incorporate an assessed element for both sets of students and make the learning space almost entirely virtual using the BU virtual learning environment (VLE) called myBU. It is the outcome of these changes that are reported in this paper, using data gathered from the on-line discussion forums and the feedback from students.

The activity has proved to be an extremely valuable learning experience for both sets of students, providing simulation of real life for both designers and IP lawyers and bridging the academic/industrial interface.

Keywords: Intellectual Property; student centred learning; collaborative learning; product design

1 INTRODUCTION
As recognized by the Engineering Council UK (ECUK) an understanding of Intellectual Property rights is essential in order to practice effectively as a professional engineer and/or designer. Indeed, ECUK make this explicit in UK-SPEC [1], section A2, "Engage in creative and innovative development of engineering technology and continuous improvement systems…..secure the necessary intellectual property rights." However, as Roach and Soetendorp [2] report there are low levels of awareness of IP among undergraduates on, and recent graduates of engineering/design courses in the UK. They also report that there are a number of perceived barriers to the incorporation of IP into the engineering/design curriculum. These barriers are reported as [2] p3:

- Engineering academics' belief that IP content is not as important as other engineering content;
- The engineering curriculum is already overcrowded and could not support any new subjects;
- No established pedagogy for creating well planned, integrated, sequenced and cumulative learning experiences to integrate relevant material form other disciplines into the core engineering curricula.

2 CONTEXT

Roach and Soetendorp [2] report that a number of IP organizations around the world, such as the World Intellectual Property Organization; The Canadian Intellectual Property Office and the European Patent Office (EPO) consider IP education to be important, to the extent that the EPO run workshops specifically for universities to disseminate knowledge about IP. The Treasury Review of Intellectual Property [3] unfortunately chose to focus on the negative aspects of IP education, that is, protection from fraudulent copying but did not emphasize the positive aspects related to the relationship of IP to commercial success. A recent study of small and medium size enterprises undertaken for the DTI and UK Intellectual Property Office (UK IPO) [4] also reveal IP is regarded as important to incorporate into the engineering/design curricula. There are other indications of the need to set the traditional engineering curricula in a wider context, for example, enterprise is becoming increasingly important in the engineering/design curricula [5] [6], although, IP is only mentioned in passing, again missing the important link between IP and commercialization of ideas and products.

Then there is, of course, the third of the barriers stated above which requires a pedagogy to be established to enable the effective integration of this contextual materials. It has been well established [7] that for deep learning to occur certain types of learning and teaching method work better than others and that generally this means that students must engage fully with the subject. One of the most effective methods of doing this is to engage the students in a 'real-life' scenario or problem which they must first understand and then seek knowledge to solve, along the way developing their skills. Soetendorp [8] based on Hennessey [9] reports on a number of different approaches that she has taken to teach IP material to engineering and design students, namely, the case method; the problem-solving method; the simulation method; the clinical method and the doctrinal method. While Soetendorp reports that she has tried most of these methods with different groups of students it is the clinical method that is of interest here. This method is based upon the idea of one group, that is, patients, seeking advice from another, that is, doctors or, more generally, professionals. Thus here the 'clinic' is not a medical practice but a law practice.

2.1 Advice Letter

As Roach and Soetendorp report [10] a learning and teaching methodology has evolved over a number of academic years. It is based around the requirement for the LLB students to construct an advice letter and follows the 'clinical' method discussed above. In simple terms a group of final year undergraduate students on law courses advise a group of final year undergraduate students, conducting projects to design/engineer products, as part of their design/engineering courses. The nature of this advice takes the form of a letter such as that which an IP lawyer might write to a client who is a designer or engineer and who has approached them with a product or engineering solution. In other words there is an expectation that a range of issues are pointed out to the client, such as, what form of IP might be applicable (Patent, Registered Design etc) or whether the design as it stands infringes anybodies IP (so effective searches must be conducted). Clearly, this requires the lawyer to understand the work being presented to them by the designer/engineer and it requires the designer/engineer to ensure they are both explaining the work fully and getting their questions answered.

They quote ([10] p13) David Morgan, Enterprise and Education Development Manager with the UK Intellectual Property Office

> I am most impressed by the innovative approach taken…to deliver what is sometimes perceived as a difficult subject to undergraduates, that is a means of conveying to undergraduates some understanding of the key role that IP plays in enabling business to compete successfully in global economies…At the UK IPO we consider engagement with this target audience to be a key element in attaining one of our objectives which is to…ensure they acquire sufficient knowledge and understanding of the key role that IP plays in enabling business to compete successfully in global economies.

3 THE PROJECT

This learning experience has been run at BU since academic year 2006/2007, albeit iterative changes have been made each time the project has run. The learning experience involves collaborative student

centred learning between PD and LLB final year students at BU. The final year product design students are required to design and produce a working prototype of a marketable product. The Law students advise on the intellectual property aspects of the design culminating in a piece of assessed work taking the form of an Advice Letter, as described above. The number of students varies year upon year but typically involves around 100 students. This provides a real-life scenario, the PD students have very 'real' projects which some of them go on to commercialize. As these students have to manufacture a working prototype they have fully developed designs thus they have both a genuine interest in potentially protecting their IP and a good level of detail and understanding of the design of the product. Therefore, providing the LLB students with 'real' product designs to work with that they need to do 'real' searches upon and offer advice that might seriously be taken up by the PD student.
In the first year of operation individual PD and LLB students were paired together, however, situations arose where one or other party did not fully engage leaving the other student in a difficult, and in terms of assessment, inequitable situation. In the subsequent year PD and LLB students were grouped together in groups of 4/5 students, this also had the added advantage of dealing with unequal numbers of PD and LLB students. For the first time in academic year 07/08 both PD and LLB students had assessed elements, the LLB students continuing to undertake the Advice Letter but the PD student being required to peer review the advice letter and to produce a chapter of their Final Year Project Reports on Professional Issues majoring on an IPR analysis of their product – this element is approx 15% of their final project report. Additionally, communication via the BU VLE – myBU using group based discussion forums was introduced. A well respected, retired Patent Attorney also offered a prize for the best PD and best LLB student and for the group that worked the most effectively.
In each year of operation the learning experience has been commenced at a 'Masterclass' that PD and LLB students attend where specialists give presentations. The specialists have included Patent Attorneys, practicing IP Lawyers, individual designers/inventors who have had to defend their own IP as well as representatives from companies who exploit IP to further their business success. In academic year 2007/08 the students were also introduced to the operation of the discussion forums via the VLE and introduced to each other in their respective groups at this event. The evaluation of the 2007/08 operation was conducted by analysis of the discussion forums, which all academic staff involved had access to, and by analysis of the Peer Review forms.

4 RESULTS

The results presented here are based solely on the 2007/08 operation of this learning experience. There were 51 PD students and 46 LLB students who were divided into 23 groups. The results take two forms: extracts from the VLE based discussion forums and from the peer review of the advice letters undertaken by PD students.

4.1 Peer Review

PD students were asked to respond to the following questions relating to the Advice Letter produced by the LLB students:

- Advice letter – presentation (eg was advice well presented?)
- Advice letter – clarity (eg Are you clear about your needed IP actions? Does the advice letter accurately reflect the previous communications and meetings that you have had?)
- Communication (eg Was this two-way?/Did your questions get answered?)
- Timeliness (eg Did you get replies within a reasonable time frame?/Did you have to chase for results or did the IPP student manage this process well?)
- Meetings (eg did LLB student initialize meetings and conduct them in a professional manner?/Was feedback given after meetings to confirm discussions?)
- Other factors

They were then asked to assess the advice letter on a score of (low) 0-5 (high) which contributed to 5% of the mark for the assignment. Table 1 below indicates how many PD students scored the LLB students at each mark.

Table 1. Student Marks for Advice Letter

Score 0	Score 1	Scored 2	Scored 3	Scored 4	Scored 5
2	0	1	3	23	22

As can be seen the vast majority of PD students scored the LLB students advice letter highly with comments that included:

- "professionally laid out, well referenced";
- "I did not need to ask many questions because the options were discussed in a clear manner. However, the questions I had did get answered.";
- "The meetings were always conducted in a professional manner although every meeting was interesting and friendly.";
- "The communication between us was excellent and was very frequent. Everything that I asked was always corresponded to quickly and enthusiastically."

Those few students that gave low marks gave the following reasons:

- "From viewing the myBU discussion forum it is clear that communication between the IP students was evident, however, they were not successful in effectively communicating with the PD students";
- "Several meetings arranged but not enough in advance to be able to attend";
- "In the end I do believe my questions did get answered but there were a few teething problems";
- "Very little advice was given about my own product".

It needs to be acknowledged that as the PD students knew that their marks were going to 'count', albeit only for 5% they may have been reluctant to 'penalise' the LLB students, however, for the PD students this is an important exercise and is, perhaps, evidenced by the number of questions I receive, as Final Year Project Manager for the PD students, prior to the learning and teaching experience commencing related to confidentially. To ensure all parties take the work seriously and act professionally at the Masterclass Non-Disclosure Agreements (NDAs) have to be signed by all students, both PD and LLB before any information is exchanged.

4.2 Extracts from Discussion Forums

A typical email trail from academic year 06/07 can be found in the work of Roach and Soetendorp thus, the results presented here are from academic year 07/08 when the discussions were captured via the myBU based virtual discussion forum. Below are two extracts from the communications of two different groups, these are representative of the kind of discussions that this learning and teaching method encouraged.

> From our previous meeting/mobile phone messages, I know that for your presentation you were attempting to think of a company name to accompany your product. If this name is distinctive it would be possible to register this as a trade mark, which I will be advising you to do in our advice letter to you. This will both enable consumers to identify the products origin and will allow you to seek remedies for possible infringement. If you are having difficulty with a company name, it is possible to register an individuals name as a trade mark.

As can be seen this is the kind of professional advice that would be expected to be obtained from a lawyer.

> …met up today to discuss your products and the info we have for you. We've come up with some questions we'd like you to answer so we have a bit more info and which will hopefully be less time consuming for you.
>
> 1. Are you planning on using a logo on your product (even if you haven't finalised this)
>
> 2. Where did the design for your logo come from? is it totally new or inspired by and existing logo's being used on the market.
>
> 3. All of your specifications outline what your product 'must' do or what you intend it to do, but what is it they actually do - Basically how do they work, the process and technology of it working; For example the heated Ice Cream Scoop - how does it heat up? how does it work .
>
> 4. Is there currently anything similar on the market, that you know of?

5. If there is currently something on the market that is similar to your product, how is yours different? what have you changed? and what about that is new?and;

6. Where are you looking to market your product? UK, Europe or internationally?

This information seeking communication indicates how the LLB students are attempting to understand the requirements of the PD students. It is fair to say that generally the information was sought by the LLB students rather than the PD students although the first example was in response to a question from a PD student.

5 CONCLUSIONS

The overwhelming conclusion is that this experience provides a 'real life' experience for both sets of students. The LLB students gain the experience of attempting to seek and understand information outside their normal domain. As well as experiencing what it is like to work with real designers/engineers who are engaged on real design work. While the PD students have their awareness raised about IP and gain understanding about the whole range of IP issues. They also experience working with a totally different group of students that they would not normally engage with on a professional level and have to explain their designs to a 'lay' audience. It demands that both parties take a level of responsibility and a professional approach to exchange of information and time planning.

The advantages of this pedagogical approach are many fold. It is clearly student centred with minimal intervention from academic staff once the learning experience is launched via the 'Masterclass'. It requires the students to collaborate to enable success of either party, thus, requiring an immediate sense of ownership – they are in charge of the experience, it is not 'being done to/for them'. Due to the explorative approach that is required deep learning is facilitated, there is no possibility that this work can be conducted successfully by rote learning, even if the initial knowledge of the various forms of IP gain be gained this way the application of that knowledge to a specific product requires understanding to take place. This is furthered by both parties seeking information for their own, separate yet related purposes. The introduction of the virtual learning space has had the benefit of formalizing the communication and also allowing capture for analysis purposes. The introduction of an assessment element for the PD students has ensured a more equal collaborative environment is encouraged and has also focused the PD students on this important but relatively small element of their final year project. The learning experience is being run again in the current academic year 2008/09 in an identical format to that run in 2007/08. Looking at the activity on the discussion forums of myBU of the 24 groups that exist this year there is evidence of more activity earlier in the cycle than in previous years, this may be the result of a higher level of familiarity of working with myBU and discussion forums in general by this cohort of students than previous. At this stage of the cycle the majority of exchanges are seeking and clarifying information by both parties, it would be anticipated that the activity will move towards greater analysis and application as the cycle proceeds.

6 FURTHER DEVELOPMENTS

It should also be noted that BU runs a separate Commercialization Programme from its Centre for Research and Enterprise which is not directly linked to the work presented in the study but which indirectly benefits from it. The Commercialization Programme is a unique programme which supports undergraduate students to commercialize the outputs of their final year projects. This can take the form of filing patent applications, which BU will defend on behalf of the student if required, seeking license arrangements or other forms of funding to enable the product to be brought to market. Although not directly linked to the work reported in this study most students entering the programme come from the PD course and there are indications that the raising of the profile of IP begs students to ask the question 'why?' and one answer, of course, is to facilitate commercial exploitation. Some successes of this programme can be seen at www.bournemouth.ac.uk/s2b/bui .

There are plans, in the form of a joint funding bid between the two Schools involved at BU, to further develop the on-line support aspect of this learning and teaching exercise and also to disseminate the work to other Higher Education Institutions (HEIs). It may be possible, with development of on-line delivery and support, for students from two separate HEIs to work together, this may be particularly beneficial where an HEI does not offer both design/engineering and law courses. The possibility of

linking the exercise more explicitly with the commercial exploitation of design, noted above, is also something that is being investigated, this may involve graduate or practicing designers/engineers who are seeking further understanding of IP process and issues.

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