

National Council for Graduate Entrepreneurship Research Report 005/2006

Managing Student Intellectual Property

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1. Executive Summary

1.1. Background to the Issue

Recent years have seen an unprecedented growth in the number of Higher Education (HE) students engaging in entrepreneurial development and new venture creation. Although lagging behind the popularity with undergraduate students, there also appears to be an increasing growth in the involvement of both taught and research postgraduate students. HE institutions (HEIs) are also recognising that postgraduate students may produce the most rich intellectual property (IP) ideas and represent the best 'carriers' in terms of taking ideas to market. However, at all levels IP issues may arise that may both hinder the development of new ventures and also provide an immediate unsatisfactory experience for the student concerned. In addition the student may develop a negative perception that could affect their relationship with institution as an alumni in the longer term.

As the interest in entrepreneurship grows so will the potential for students to receive a poor experience and conflict can arise within an institution if appropriate mechanisms for support are not put in place. However, managed effectively the commercialization of student IP can produce positive outcomes for all parties concerned – including; financial return, increased reputation, contribution to regional development and the development of an enterprise culture.

1.2. Outline of the Research

Anecdotal evidence from students and practitioners suggested that concerns about how student IP was being managed was likely to be a national concern and funding from the NCGE allowed research to uncover how institutions were dealing with this issue.

A national web based survey was developed to collect data against a number of key themes. These were identified as IP awareness, assignment of IP, education and training, institutional practice on student IP (including protecting and commercializing student IP and financial resources) and personal perspectives of institutional policy and practice of student IP. Responses were received from 65 institutions (52% of University Institutions, Universities UK 2005). In addition 17 semi-structured face to face interviews were undertaken and a small number of case studies illustrating the student experience produced. Principles of good practice were identified and collated.

1.3. Summary Findings

Findings and implications were focused around 6 key issues; the institutional perspective, collaboration, policies and procedures, communication,

education and IP protection & commercialization. A summary of the findings are:

1.4. Institutional Perspective

The majority of institutions now recognize that student IP is an issue that requires attention. There appears to be a trend away from blanket ownership of student IP to a situation where all individuals are dealt with on a case by case basis. In relation to the achievement of outcomes some institutions see the commercialization of student IP as a means to secure a financial return. Other institutions value 'softer' outcomes such as, enhanced student experience and reputation of the institution, regional development and contributing to the development of an enterprise culture.

1.5. Collaboration

Whatever the desired outcomes, collaboration, particularly between technology transfer or business development functions and student facing enterprise services, is crucial to the effective management of IP. Ultimately the extent of collaboration appears to be influenced by the values and approach to the work of those concerned rather than necessarily any institutional policy or structure.

1.6. Policies and Procedures

Generally policies, where they existed, were out of date, did not reflect current practice and inaccessible to students either in terms of where to access it and written in a style that was user friendly. A majority of the institutions involved were reviewing policies or had recently implemented new policies and procedures. There was common agreement that the process of developing policies and procedures should be inclusive and not undertaken by IP experts in isolation.

1.7. Communication

Lack of clear communication about IP issues, policies and procedures was a universal theme across the research. There were major concerns relating to the legal and ethical aspects of students assigning IP without the relevant knowledge and understanding. The communication of IP policies and procedures often lacked active engagement.

1.8. Education

The education of both students and staff was acknowledged as a key issue in improving the management of student IP. Currently IP education is summarized as either absent, or if present is often limited and may not be related to needs in respect of timing or content. There are barriers to overcome in terms of making IP education more accessible and these include, resistance to the idea that non-experts can input on IP, getting IP embedded in the curricula, accepting that IP knowledge is relevant in other aspects of employment and research (not

exclusive to new ventures or commercialization), making IP discipline or sector specific and considering the timing of any input and ensuring content is relevant to needs.

1.9. Protection and Commercialization

Apart from practical support and the access to funds for protecting IP the key issue here to address is the process by which the institution negotiates with the student in respect of any agreement to support commercialization in return for a stake in that venture. The effectiveness of this process is determined by the position the institution wishes to take in respect of student IP, the quality of the support and signposting, and the extent of collaboration between parties.

An outcome from the project included the development of four profiles that illustrate the effectiveness of IP management in relation to the clarity on the institutional position, extent of collaboration between parties, how well policies and procedures are communicated, availability of educational opportunities for students and staff and achievement of outcomes. A number of principles of good practice were collated against the key issues that offer some insight into practical ways of managing student IP more effectively.

1.10 Implications for NCGE

From the student perspective, it is clear that the quality of their experience in relation to IP depends on which higher education institution they attend. To reduce this 'lottery' effect it is therefore recommended that the NCGE develops a strategy to approach to influence policy makers, educate the educators and develop future entrepreneurs. In this way developing IP education standards that all HEIs can adhere to and by ensuring it is embedded in the curriculum, links the teaching and learning strategy to third strand strategy over the long term and reduces conflict between the two agendas.

Influence policy makers and senior managers at a national and institutional level to ensure IP as an issue is raised and commitment offered to address concerns and promote good practice.

Educate technology transfer, business development and enterprise practitioners so that they can take a role in promoting collaboration, developing good practice and promoting IP to students effectively. Include IP awareness raising and advice within any operational activity delivered directly or promoted by the NCGE. This should also involve working collaboratively with relevant agencies to ensure materials reflect the needs of students.

Promote further projects and research that could include; benchmarking minimum levels of education and support across the sector, longitudinal projects that support institutions making the transition from relative ineffective to

effective management, developing and evaluating teaching practice and undertaking comparisons internationally.

Whilst student and graduate entrepreneurship may contribute to third strand outcomes, including a financial return to the institution, this national research project focuses on the student perspective and how an optimal experience can be provided through the development of appropriate policies and practice.

2. Introduction

What was the motivation for the project?

The motivation to investigate the national picture of how different HEIs manage student intellectual property was driven by recent experiences at the Enterprise Centre, University of Newcastle in supporting student start up activity that related to their intellectual property or discipline specific know-how. Nationally, HE institutions are recognising that postgraduate students may produce the most rich intellectual property (IP) ideas and represent the best vectors in terms of taking ideas to market. However, at both levels, particularly for postgraduates, IP issues may arise that may both hinder the development of new ventures and also provide an unsatisfactory experience for the student concerned. As the interest in entrepreneurship grows so will the potential for students to receive a poor experience and conflict arise with the institution if appropriate mechanisms for support are not put in place. Whilst student and graduate entrepreneurship may contribute to third strand outcomes, including a financial return to the institution, this research project focuses on the student perspective and how an optimal experience can be provided through the development of appropriate policies and practice.

What were the aims of the project?

The aims of the project were to:

- i. Investigate how student undergraduate and postgraduate IP is currently managed across the HE sector (both pre and post 1992);
- ii. Identify pertinent issues in the management of IP particularly in respect of postgraduate students;
- iii. Inform changes in current practice to enhance both the student and institutional experience to mutual benefit.

What did the project expect to achieve?

The expected outcomes for the project were:

- i. An understanding of the extent and nature of issues arising from the management of student IP, particularly in relation to postgraduate students;
- ii. The identification of potential good practice in the management of student IP;
- iii. The raising of awareness in relevant communities as to the current issues and possible management strategies;
- iv. The identification of practitioners who may form an interest group;
- v. Recommendations for any future project that would attempt to influence current practice.

How was the project managed?

The research was conducted by Paul Freeman, Team Leader for the Enterprise Centre, Newcastle University and Dr Emma Barron, Business Development Officer, Faculty of Humanities and Social Sciences. The project was managed by a small steering group made up of an intellectual property lawyer, an academic entrepreneur and a business development manager with experience in supporting the development of science and technology based businesses. These were as follows:

Alex Craig, Robert Muckle Solicitors
Professor Max Robinson, North East Centre for Scientific Enterprise
Paul Sutherland, RTC North

The main focus of the group was to consider the wider context and impact of the research, ensure the project stayed on track and identified links between the project and opportunities in the wider world.

How was the research conducted?

Data was collected via: A web based survey consisting of 23 questions covering the following areas: IP awareness, assignment of IP, education and training, institutional practice on student IP (including protecting and commercializing student IP and financial resources) and personal perspectives of institutional policy and practice of student IP.

The survey was distributed via various networks and responses were received from 65 different institutions representing 52% of University Institutions in the UK.

Responses were geographically diverse and reflected views from pre and post 92 institutions. Face to face semi structured interviews were completed with key individuals in 17 institutions that represented the variety of the sector. In addition case studies focussing on the student experience of IP protection and commercialisation were commissioned.

Project deliverables

The deliverables from the project are

- i. Sets of data generated from the research and a project report outlining findings and recommendations to take the agenda forward.
- ii. Identified principals of good practice that could form the basis of practical guidance on how to manage IP effectively. These will form the basis of a practitioner's guide (see appendix B).
- iii. Two case studies have been developed illustrating the student perspective and experience of protecting and commercialising intellectual property. These could be developed as a resources for use with policy makers, students and practitioners (see appendix A).
- iv. A working paper suitable for the academic community and forming the basis of a refereed article for publication (see appendix C).
- v. A presentation that overviews the project, initial findings and implications for Higher Education (see appendix D)

Findings

The research identified six key issues to address in order to successfully manage student intellectual property:

- I. Institutional perspective
- II. Promoting collaboration
- III. Policies and procedures
- IV. Communication
- V. Education
- VI. Protection and commercialisation

I. Institutional Perspective

A continuum of institutional perspectives around the management of student IP emerged from the research. The two positions outlined below are at the extremes of a continuum and institutions may be positioned anywhere along that line.

1. Institutions who attempt to minimize risk, often resulting in IP policies claiming ownership of all IP.

2. Institutions who have moved, or are moving, towards dealing with IP on a case by case basis.

Within this second position there appear to be two forms.

- 2a. Student IP is valued because it will potentially provide a high return to the institution and students who assign receive full support as if they were staff.

This is a 'pure' version of the commercial approach but students with low value ideas or where there is no assignment may be ignored. If they are provided for, they are dealt with by student facing enterprise facilities.

- 2b. Student facing enterprise activities and support are provided in parallel to the usual academic support for commercialization.

In determining their stance institutions may see student IP as a potential Aladdin's Cave full of varied treasures that are there to be claimed or a Pandora's box – once opened a multitude of problems will emerge to swamp the institution.

II. Collaboration

Typically a positive working relationship between technology transfer or business development and the student facing enterprise functions increases the effectiveness of IP management, commercialization and student experience.

However, the key factor in the extent of collaboration between parties is the degree of acceptance in the idea of enterprise being an educational process that may also have 'softer' outcomes for the institution. These might be building the reputation of the institution and developing long term relationship with their graduates. Ultimately the extent to which collaboration happened appeared to be influenced by an individual's approach to work in this way rather than necessarily any institutional policy.

III. Policies and Procedures

A number of institutions appeared to be in the process of reviewing and re-launching their policy statements with a trend away from blanket ownership of undergraduate IP and an increase in postgraduate research assignment. This could be a result of an increasing recognition by institutions that postgraduate IP potentially provides both the richest IP and sources of conflict due to the increase in stakeholders involved.

There seemed to be general agreement that the development of IP policies should be an inclusive process and not solely the responsibility of legal experts. For example, engaging more 'student facing' services such as careers services and students union is perhaps an important strategy when considering the subsequent communication of the policy.

IV. Communication

Whilst in many institutions documents exist that outline IP policy for students, in the majority of responses it is not clearly communicated or written in a style that is accessible. While some institutions may expect assignment on registration students are usually not informed/educated about what intellectual property is and what the implications and benefits of assigning it to the institution. Inconsistency in communication across schools and departments was another feature leading to inequality across the same institution. There are particular communication and ownership issue in managing IP arising from the work undertaken by international students.

V. Education

Education for students is key in raising awareness, developing skills and motivating potential student entrepreneurs to explore IP further. The role of staff is crucial as it is often staff closest to the student that subsequently affects the student perception of how their IP is being managed.

Awareness raising and skill development is at best patchy and an issue that is only just beginning to be considered. Intellectual property education does not form part of many credit bearing courses and whilst there are more opportunities for non-credit bearing courses one needs to consider that students are increasingly strategic learners so may often miss out on these opportunities as the immediate benefits are less clear.

The survey revealed, for example, that if there was input into the curriculum the majority of students may receive this only once, perhaps not necessarily at the right time and that it may be a very 'hit and miss' occurrence depending on the degree programme and discipline. Timeliness at an individual programme level may be important.

There appears to be a growing attitude that IP is something that could be delivered initially by 'non experts' and that it might be a question of discovering the amount of information that is needed to empower and motivate students to take it further. In delivery and content the practitioner may have to consider the possible differences in culture and likely commercialization routes between science and humanities based disciplines.

VI. Intellectual Property Protection and Commercialization

With students arriving at university increasingly sensitized to enterprise and IP issues, the challenge for staff will be to meet these demands as students grow more confident with the topic. As well as the development of student awareness and knowledge around intellectual property in their own right, another key issue is ensuring they understand their institution's support mechanisms to protect and commercialize their IP.

In respect of conflict resolution institutions varied between informal and formal processes. But in many cases, conflict issues have not arisen yet where IP has been managed effectively or there are low levels of IP based ideas coming forward.

Anecdotal evidence suggests students are often signposted in different directions and get frustrated by the bureaucracy and confusion that exists within particular institutions as to points and levels of support. This is in part reflected by the institutional '*stance*' and whether the institution will provide financial support for IP protection and commercialization. Aside from the financial support, large amounts of staff time are taken up in trying to clarify IP ownership and the most appropriate route for support and commercialization.

A number of institutions taking part in the project are clearly considering the role of students in assisting with achieving financial or other 'softer' outcomes and the type and level of support they should receive in return. One particular group that is receiving attention in their role as 'agents of commercialization' is that of postgraduate students. The agenda to engage more postgraduates in commercial awareness and relevant skills is likely to continue and possibly increase as universities are now recognized as playing a pivotal role in economic development in a knowledge based economy. In this context, embedding intellectual property awareness and understanding within the postgraduate experience will be critical to maximizing commercial opportunities reaching the market place.

Institutional Profiles

From the survey and interviews attempts have been made to capture the above issues and develop a series of profiles that describes how effectively an individual institution may be currently managing student IP. These are described in Figure 1. The two axes represent the degree to which institutions are focused on management or student outcomes and whether the institutional response is reactive or proactive. Management focused institutions are primarily interested in potential revenue streams from student IP whereas student focused institutions recognize other benefits such as enhanced reputation, increasing student recruitment and regional graduate retention.

Whilst there is no right or wrong approach an HEI needs to consider the longer term impact of the student experience. For example, if a student perceives that they are only valued for potential revenue, this could affect the future relationship with a successful alumni. In contrast, where HEIs are too student focused and there is no strategy, revenue might be lost which could contribute to supporting student ventures in the future and other institutional benefits may not be realized.

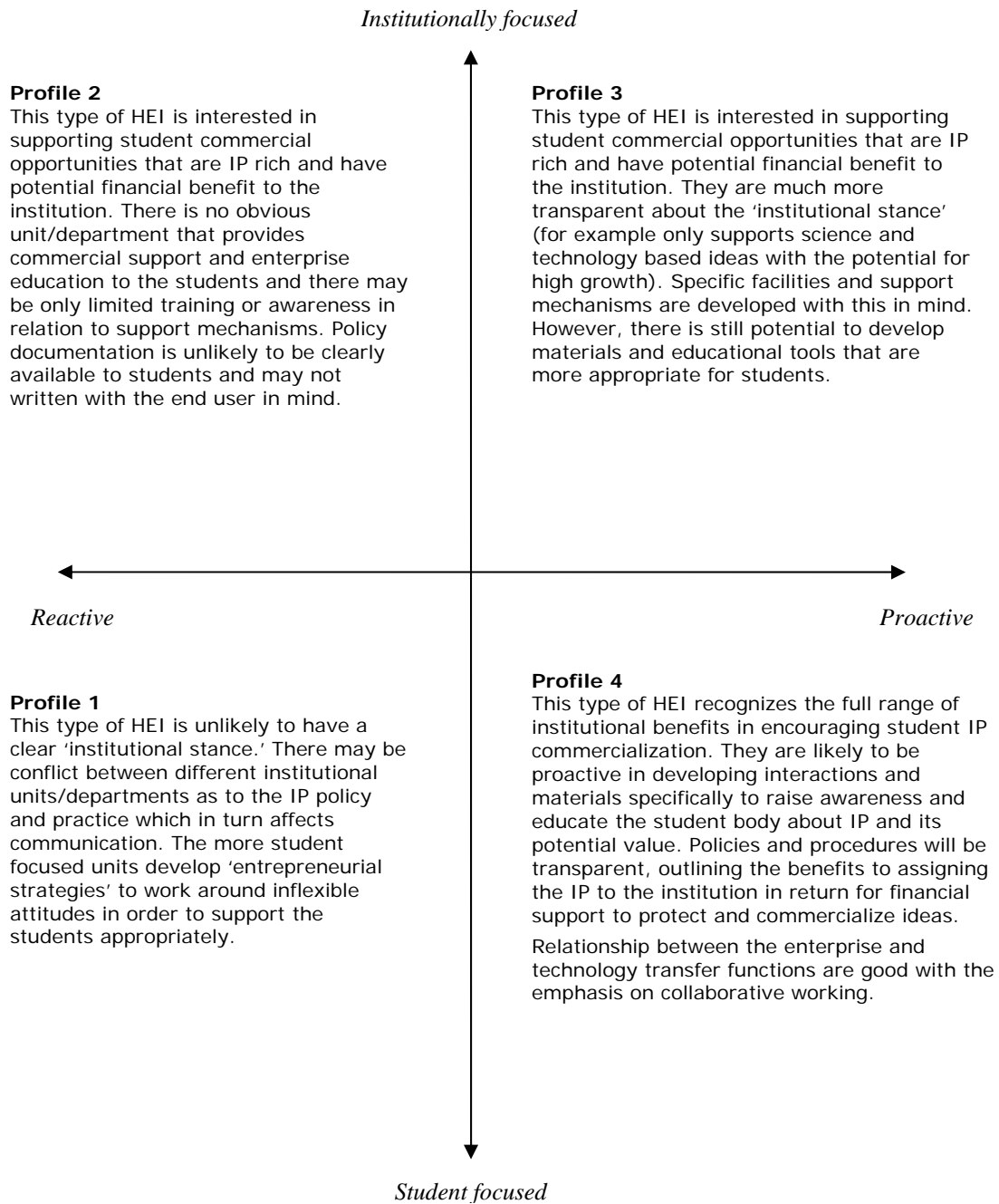


Figure 1: Profiles of institutions describing position in relation to student IP policy and practice.

3. Dissemination

A number of presentations have been made over the course of the project including:

10th October 2005, Engineering Enterprise through IP Education, Patent Office, London.

An event as part of a joint project to promote inter-disciplinary event collaboration between the engineering and law subject centres. Representatives were also present from the Patent Office, World Intellectual Property Organisation (WIPO) and the University of Technology Sydney.

17th October 2005, Innovation in Intellectual Property Education, Bournemouth University.

Organised as part of the Distance learning approach applied to enhance the introduction of Intellectual Property in management Strategies of enterprises (DIPS). A Leonardi da Vinci programme involving 12 partners in 5 European countries. Representatives were also present from Rumania, European Patent Office (EPO) and the World Intellectual Property Organisation (WIPO),

1st – 3rd November 2005, Institute of Small Business & Entrepreneurship (ISBE), Blackpool.

Working paper and associated presentation delivered as part of the *Advancing entrepreneurship education, learning and skills conference* track. (see Appendix C & D)

The project has been asked to deliver to individuals responsible for technology transfer and business development within the Russell Group in January 2006. Interest has been generated in the project from EPO and WIPO with both organisations keen to receive outputs from the project

The project has benefited greatly from the input of an associate from a regional legal firm, Robert Muckle Solicitors. As a result of being involved in the project, the company is interested in running an IP awareness raising and educational forum for the five regional universities (Durham University, University of Newcastle, University of Northumbria, Sunderland University, Teesside University).

Dissemination Strategy

The following table suggests a dissemination strategy:

Aim	Activity
Raising awareness and influencing policy at a national & individual institutional level and with relevant bodies	<p>Inclusion of the IP agenda within relevant forums for Vice Chancellors and Senior Managers</p> <p>Dissemination of findings to national and international relevant bodies e.g. Patent Office, WIPO, EPO, AUTM, PROTON.</p> <p>National press and publicity through relevant publications e.g. Times Higher, Financial Times</p>
Raising awareness with students and graduates	Inclusion of the IP agenda within relevant student forums e.g. NUS, Acumen, AGCAS
Raising awareness in Higher Education, with legal and business support professionals	National press and publicity through relevant publications e.g. Times Higher, Financial Times, Legal Week and the Lawyer.
Building capacity and influencing practitioners.	<p>Inclusion of the IP agenda in relevant conferences, training and network events e.g. AURIL (Association of University Research and Industry Links), PRAXIS , HEA (Higher Education Academy), Subject Centres.</p> <p>Summary of findings and presentation available on web with outlines and links with other sites e.g. HEA, subject centres, AURIL, enterprise CETLs (Centre for Excellence in Teaching and Learning)</p> <p>Promote collaborative projects with other relevant agencies e.g. Patent Office THINK Kit development.</p>
Embedding IP in the curricula to raise awareness and ensure sustainability	<p>Promotion of IP in the curricula through liaison with HEA Subject Centres.</p> <p>Commissioning curricula development projects to encourage academic engagement with the issue.</p>

Implications for the NCGE

Influencing Policy Makers

Influence policy makers and senior managers at a national and institutional level to ensure IP as an issue is raised and commitment offered to address concerns and promote good practice.

As the findings indicated, HEIs fall into a number of different profiles, reflecting the complexity of intellectual property issues and the range of approaches in dealing with those concerns. In taking this agenda forward, the NCGE as a national body first and foremost needs to raise this agenda at influential levels within HEIs, for example with vice chancellors, senior managers and relevant policy bodies. Taking this 'top down' approach will complement those institutions where student facing units are tackling this at 'grass root' level (for

example profiles 3 and 4) and kickstart awareness raising in those institutions where a less proactive approach is being taken. This could be achieved initially by developing and providing a 'diagnostic tool' that enables an institution to identify which of the four profiles it resides within and then providing appropriate resources to facilitate progression from the position where an institution is currently at to where it would ideally wish to be.

Educating the Educators

Educate technology transfer, business development and enterprise practitioners so that they can take a role in promoting collaboration, developing good practice and promoting IP to students effectively.

Whilst raising awareness of the agenda institutionally, the NCGE could also take a role in developing understanding in both academic staff, technology transfer and student enterprise practitioners through collaboration with relevant policy and professional bodies such as PRAXIS and AURIL. Promoting the inclusion of IP in the curricula could be achieved through the HEA and subject centres.

Include IP awareness raising and advice within any operational activity delivered directly or promoted by the NCGE. This should also involve working collaboratively with relevant agencies to ensure materials reflect the needs of students. IP awareness then needs to be embedded within the Flying Start and other NCGE national programmes. The project team felt there was potential for regional based events that would bring together institutions to explore the issue of IP and work collaboratively on local solutions to the issue.

Deeper understanding of what intellectual property is, how to protect and commercialise it and where to get appropriate support needs to be embedded within the curriculum for students to understand its importance. Whilst much of the information is generic institutions will take different decisions about how and when to educate their students about IP. Rather than all institutions individually developing curricula resources and teaching materials separately the NCGE could take a role in providing templates and other 'off the shelf' resources that institutions could then contextualise for their particular needs. This could be further supported by a funding stream for curriculum development that would encourage the sharing of good practice in this area. This model reflects the role that the Higher Education Academy has taken on other generic issues related to teaching and learning.

The project manager and director are keen to take an integral role in the development of the ISBE working paper in collaboration with Professor Paul Hannon into a refereed journal article that would reach a wider section of the academic community, and to develop a concise NCGE good practice guide

that summarises the findings and principles of good practice once the final report and findings are approved.

Testing Implementation

The NCGE should consider implementing projects to test emerging ideas and undertake further research. Projects could include; benchmarking minimum levels of education and support across the sector, longitudinal projects that support institutions making the transition from relative ineffective to effective management, developing and evaluating teaching practice and undertaking comparisons internationally.

Taking a three pronged approach in addressing policy, education and research ensures a comprehensive and sustainable way of raising awareness of the increasing importance of intellectual property rights in economic development and the student experience. Furthermore, such a strategy will ultimately form an essential ingredient of developing long term culture change across higher education in terms of engaging with commerce and industry.

If the NCGE were to take on the above activities, the authors would recommend piloting the implementation and evaluation of these activities and tools within a small number of institutions to include a traditional, research based institution, a post-1992 institution and an institution with an arts and culture focus. Ideally one would identify institutions that are currently reviewing their current policy on intellectual property. This would allow research to attempt to measure the progression of these institutions as a result of NCGE support, materials and guidance. It would also provide an opportunity for evaluation and feedback on materials before they are promoted more widely.

Recommendations

Short Term

- Examine dissemination strategy and prioritise activity in collaboration with *Twelve*, the NCGE public relations company.
- Link up with appropriate bodies such as Universities UK to raise the agenda with vice chancellors and senior managers.

Medium Term

- Broker relationships with professional bodies such as PRAXIS, AURIL, The Patent Office and the HEA to raise the agenda and develop 'off the shelf' teaching materials.
- Pump prime the development of teaching of IP by non IP experts by providing funding for curriculum development.
- Support the development of the research into a refereed paper for wider circulation into the academic community.

- Support and attend regional event in North East to be led by Robert Muckle Solicitors.
- Build on those links made within this project to form special interest group in IP education.
- Dedicate NCGE web space for teaching resources, sharing of good practice and the special interest group.

Long Term

- Support further regional events that foster relationships between HEIs and IP solicitors.
- Fund and evaluate longitudinal projects that support institutions making the transition from relative ineffective to effective management.
- Develop and evaluate teaching practice and undertake comparisons nationally and internationally.

The authors would like to thank the NCGE for commissioning this work which has provided an insight into this growing topical, complex issue and are willing to contribute to further discussions about taking this agenda forward. Informal feedback from interviews and the dissemination event indicates this is a very timely issue that many practitioners are struggling with and require support with. The NCGE is well positioned to take a lead on this agenda to improve both the student and institutional experience, ensuring the enterprise culture is maintained and developed in higher education.

4. Appendices

4.1. A. Case Studies

Case Study 1 – Protecting and Commercializing Undergraduate IP

How does this story start?

The device I developed was part of a final year project for my undergraduate degree in mechanical engineering. As part of my degree I had a basic awareness of intellectual property issues but had not been involved in the process of commercialization. The project was suggested by a surgeon working for the NHS who identified a problem that needed to be addressed by the design of a device. The problem was passed on to the University who then formulated a project to design a device to solve the problem. I undertook the project under the supervision of a lecturer within the school of mechanical engineering. I developed a design that provided a solution to the problem and the basic structure of a device that would serve a niche market. The surgeon who was initially involved with the project was keen to take the device forward to a stage where it could be commercialized. It was at this stage that issues regarding the ownership of the intellectual property arose.

What IP issues arose?

The university policy for undergraduate students states that any intellectual property derived as a result of the work of an undergraduate belongs to the student. However as a result of the supervision of the project by a lecturer the university believed that they may have a share in the intellectual property of the device. In addition to this the surgeon involved claimed some ownership of intellectual property for highlighting the problem that was subsequently given to the university. Intellectual property concerns the generation of novel ideas. Had the idea for the development of a device been novel the surgeon would have had a claim. However it is my opinion that he does not have a claim as the idea to develop a device was not novel and it is the design of the device which is the novel part of the project. If discussions do lead to the conclusion that the surgeon has a share of the intellectual property this then raises another issue and involves a further party. The surgeon is employed by the NHS and as such any intellectual property that arises as a result of the work he is contracted by the NHS to do will belong to the NHS trust the surgeon is employed by. If the work was completed outside the remit of the surgeons' contract then there is a possibility that he may then claim back his intellectual property from the NHS trust.

How was the issue dealt with and by whom?

The parties involved in the discussions over the intellectual property associated with the device were the surgeon, the NHS, the university and the lecturer

allocated to supervise the project and myself. I was put in touch with Enterprise Centre by a Business Development Manager at the university. Through the networks that the Enterprise Centre has I was able to access experts in the field of intellectual property. This included a number of meetings with an intellectual property lawyer who helped to explain to me in more detail how intellectual property works and how ownership is defined. He was also able to give me his opinion as to who the ownership of intellectual property resided with in this case. He was able to say that in his opinion the ownership of the intellectual property for the design of the device belonged to me. This information helped to support my case when my ownership of the intellectual property was challenged by the other parties.

I believe that it is my interest to keep all the parties involved in the discussions involved in the project. By keeping the university involved in the project the institution will have an interest in the commercialization of the device and thus I will retain some level of access to some of the leading experts in the field and a vast array of facilities. The NHS trust will be important for the development of the device at a later stage. Following the prototype of the unit it is important that there is an NHS trust involved that will assist in the clinical trials. The surgeon will also assist in pioneering the clinical trial and ultimately the use of the device. I am currently in the process of arranging a revenue share deal that will mean that all parties will remain involved and willing to assist in the process of commercialization. I aim to acknowledge all the parties involvement and contribution to the project whilst making them aware that involvement does not necessarily mean that they own intellectual property.

What was the overall experience like?

Overall I feel my experiences with intellectual property have been fairly neutral. On the negative side I have spent a lot of time trying to get to a stage where all parties are willing to reach an agreement and not to disagree over the allocation of small percentages. I believe the lack of understanding of intellectual property by the surgeon and the school of mechanical engineering meant that false claims on the intellectual property were made. I hope that by arranging a profit share agreement prior to the product having a patent will reduce the chances of inventorship being claimed falsely on the patent as this can invalidate a patent. On the positive side I have learnt a lot about how intellectual property works and the commercialization process. I believe this is information that will benefit me in my career and will help me to commercialize any further inventions I may make.

The issue of intellectual property could have been managed much more effectively had the other parties involved in the discussions had the same access to the information I had, in particular my supervising lecturer and the surgeon involved. Had a clear policy and information been made available to

all parties I believe the project would now be closer to commercialization. The basic knowledge of intellectual property that I developed as a result of my undergraduate degree helped me in the initial stages of the project to be able to protect my idea. It also gave me some confidence to be able to discuss the project the Enterprise Centre and know the type of help I needed. I think it is really important that students have a clear idea of how to manage their own intellectual property and how to access skills and resources that will help them to do this.

What advice would you give to students?

The three pieces of advice that I would pass on to students that are hoping to commercialize an idea or to deal with intellectual property are;

Don't be afraid to ask for help. Intellectual property is very complicated and at times difficult to understand. If you get chance to talk to an expert make the most of it and ask lots of questions. The more informed you are the more ready you will feel to deal with any intellectual property problems.

Do not disclose your idea without a confidentiality agreement. This is important if you are hoping to obtain a patent. Any disclosure may invalidate your patent.

It may be your idea but be prepared to negotiate to take your idea forward to commercialization. Remember a part share in something is better than all of nothing.

Case Study 2 - Postgraduate student IP – potential issues with non-research council funding

Tell us briefly how this case study starts:

The University put in place a new code of practice on Intellectual Property (IP) in April 2005. Under this policy, the University does not automatically own student IP.

If IP is developed in the course of a studentship, which the University wishes to exploit (normally when there is an academic co-inventor), then the student is asked to assign their IP to the University in exchange for a share of future profits and for the University being responsible for protection and exploitation costs. In this way, the student is then treated the same as a member of staff.

Many students are funded either by research councils or charities which have clear guidelines stating that IP arising from a project rests with the institution and the student signs up to this on commencement of their project.

Problems arise when it is not known if the student is free to assign their IP nor who owns the IP. This is a particular issue with international students who are often funded by employers or home governments. We have had four cases of this sort

in the last year, all with different outcomes. In this case study, one particular case will be highlighted and then some ideas for policy development and best practice will be drawn up.

When and how did this issue first arise?

An academic and a student wished to form a spin-out company to exploit IP and know-how developed in the lab. One piece of IP that would potentially be used by the company was developed by the student during her PhD studies at the University. The student's PhD was funded by her employer, a non-UK government agency.

How was this dealt with and by whom?

The issue was dealt with by the Technology Transfer Office (TTO) who are responsible for the protection and exploitation of University IP.

The TTO firstly talked to the student and her supervisor to ascertain who funded her project and whether there was a formal research contract in place which covered IP (which there wasn't, as this was solely a studentship project and not part of a larger research grant). The University's code of practice was explained and the student was talked to away from the supervisor to ensure that she was happy with the rules and happy in principle to assign her IP.

The TTO then examined the student's record and checked that there was no mention of IP in the files. The record only covered confirmation of fee payments and the student's agreement to take up her place at the University.

The TTO then asked the student to provide a copy of her employment contract with her funders. This was not in English so the student was asked to read through and translate the document with the TTO to look for any mention of IP, which there wasn't.

The TTO then asked the student for contact details of her employers and a letter was drawn up to be sent to the employers, outlining the case and asking if the employer made a claim to the IP. This letter was cleared with the student and the supervisor.

The employer contacted the University to say that it did make a claim to the IP but that it was happy to negotiate terms with the University.

How was this issue resolved (or not?)

The TTO (after discussions with and approval from their advisory board) wrote to the employer asking them to assign their IP to the University, in return for a royalty. They are currently awaiting a response.

How did this impact on your experience and also attempts to commercialize your ideas?

The case highlighted a University-wide issue with student IP. Non-research council or charity funded students study at the University with a simple studentship agreement in place which does not define ownership of IP (other than in reference to the code of practice). In the past this has not been identified as an issue, as there has been limited commercial exploitation of student IP (and the old code of practice claimed University ownership of post-graduate IP). However, the University is committed to IP exploitation and commercialization and the TTO provide training and awareness events for all post-graduate students, therefore the amount of commercial activity has increased across the University and as the bulk of research is carried out in association with post-graduate students there will inevitably be more cases of this sort.

We need to make a decision as to what is the best way forward – a blanket assignment of IP from all students does not seem necessary or desirable (and is in conflict with the code of practice), but dealing with individual issues on a case by case basis is costly in terms of staff time and resources. It could potentially also be upsetting for the student as they may have to help the TTO sort out IP ownership when they are writing their thesis etc.

One issue throughout the case has been to make sure that the student is not treated any less favourably than a member of academic staff because they are funded differently. For example, it has been important to try and separate any revenue going to the third party and any payment to the student so that the student is paid an inventor's share by the University (otherwise we do not necessarily know if the student will receive a share).

Universities need to be aware of cultural and language differences when dealing with students from different backgrounds and different employers. It is not good enough to provide the student with a copy of the code of practice and then ask them to sign a form, we need to ensure that the student understands IP and the implications of assignment and we need to understand from the student the best way of dealing with their employer so that we do not harm the student's funding or future career. It is important to be aware that the employer may be reliant on the student to translate your letters so there is an issue of trust and a potential conflict of interest for the student (it may be better to have the student's contract translated independently).

It is also important to talk with the student away from the supervisor so that there can be no complaint of bullying or pressure from the academic (in many cases, students feel a debt of gratitude to their supervisors which make it very difficult to disagree with them). However, it is equally important to respect the wishes of the academic, to keep the academic fully informed of the progress of discussions and to have joint student/academic meetings.

What is the current situation?

The University is dealing with all student's IP issues on a case by case basis. We are now aware of the problem and are starting to make sure that agreements are in place as soon as IP is identified (or it is thought that the project may be of commercial interest). We always discuss the employer contact with the student and we do not assume the outcome of any situation. For example, out of the four cases we have dealt with:

- Two have said that the student owns their IP (and one has checked to make sure that the student will benefit from an assignment to the University)
- One has said that the employer owns the IP
- One has said that claims to IP must be made at the commencement of the project, and as the funding government did not do so, the IP belongs to the student.

There do not appear to be any regional or continent-wide rules and each employer must be contacted.

We have had a variety of informal advice on the topic – different lawyers have suggested either that the University should own the IP anyway (as they are providing the project), or that the University should offer the student independent legal advice before asking them to assign their IP, or that a contract should be put in place at the start of the studentship.

For the time being, we are proceeding on the case by case basis and it is working. We are raising awareness of the issue with academics and already this has been helpful.

What would have helped to manage this issue more effectively so that students have a more positive experience?

Sort this out early!

Make sure that the student understands, right at the start, that they will benefit from exploitation of IP but manage their expectations of the likely return.

Try to communicate with the employer independently of the student, once you have the student's agreement for the initial letter, but keep the student fully informed.

Make sure that the academic supervisor understands why the issue is important and that it has to be sorted out.

4.2. Appendix B Principals of Good Practice

Informed Consent

Acknowledging that students should only assign IP when they understand the issue is an important legal (and moral) concern.

What can be done?

- Producing materials to accompany registration/enrolment forms for students to develop an understanding of IP, why it is important, and the benefits of assigning rights to their institution in return for support in protecting exploiting their IP.
- Considering asking the student to acknowledge they have read the literature thereby giving informed consent.
- Be aware of cultural and language differences when dealing with students from different backgrounds e.g. international students

Managing Expectations

Transparency in terms of institutional policy and procedures is critical to managing staff and student understanding from the outset of any commercial development.

What can be done?

- Communicating the methods of protecting IP, the costs and likely timescales associated with this and routes to market can reduce unrealistic expectations and help avoid negative perceptions developing.
- Talk to students away from their employer/sponsor/supervisor and re-assure students against the perception that the institution will exploit them.
- Talk to academics and respect their wishes, keep them informed of progress.

Relationship between Technology Transfer & Student Enterprise

Institutions that have a positive relationship between tech transfer and student enterprise and who work collaboratively appear to have more effective IP management in place.

What can be done?

- Encouraging active dialogue between the two functions (and other stakeholders) is critical to ensure that territory is demarked.
- Joint teaching or involvement in related activities helps share expertise and develops relationships.

Policy & Procedures

Developing policy and procedures by involving relevant stakeholders and not just relying on legal experts helps ensure a level of buy-in from those involved.

What can be done?

- Involve Tech transfer staff with student enterprise staff, students union and careers service in policy formation.
 - Separating a (shorter) policy statement from (longer) procedures allows changes to be made in practice more easily.
 - Don't just rely on the web to communicate policy and procedures – use other relevant student services, include policy student in student handbooks, prospectus, institutional calendars etc
 - De-mystify IP as much as possible, provide route maps on the decision making process and other sources of advice.
 - Providing versions in a variety of formats such as leaflets and case studies for staff, including supervisors, schools or departments and students.
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Awareness Raising & Skill Development

Providing the right level of input, at the right time is critical to developing awareness and motivating students to enquire more.

What can be done?

- Delivering IP input before undergraduates agree projects or initial awareness raising with new postgraduate students with more detailed follow up later in their research.
- Providing a rich mix of opportunities – not relying on curriculum based delivery for example but offering extra-curricular events, mentoring and IP 1 to 1 'clinics'.
- Include staff in awareness raising as they themselves may need to gain understanding of IP and they are important stakeholders in facilitating communication and brokering with those who can support commercialization.
- Promote IP as a valuable skill in work or research - not just for those interested in commercialization.
- Develop or use existing case studies to generate discussion and promote the issues. Adapt these for different audiences e.g. policy makers, academics and students.

IP Protection & Commercialisation Support

Institutions vary in the approach to IP protection and support – ranging from only available if of high value to protecting any viable ideas. Whilst a number of institutions negotiate equity on a case-by-case basis, some institutions identified clear starting points of principle.

What can be done?

- Revenue agreements set up with a student could include a percentage return into a student patent fund that will help support future students to also protect their intellectual property in appropriate ways.
 - Offering IP evaluation and protection as a prize in business plan competitions
 - When assigning getting the parties to do this at the same time and place to highlight to the student the (hopefully) equitable nature of the arrangements and to symbolically mark the occasion.
 - Highlighting that any revenue sharing agreement should be in place e.g. 30 days after the initial disclosure. If this is not achieved then using an independent third party is brought in to resolve the conflict
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4.3. Appendix C

Student Intellectual Property: Pandora's Box or Aladdin's Cave?

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ABSTRACT

Recent years have seen an unprecedented growth in the number of Higher Education (HE) students engaging in entrepreneurial development and new venture creation. Although lagging behind the popularity with undergraduate students, there also appears to be an increasing growth in the involvement of both taught and research postgraduate students. HE institutions (HEIs) are also recognising that postgraduate students may produce the most rich intellectual property (IP) ideas and represent the best 'carriers' in terms of taking ideas to market. However, at all levels IP issues may arise that may both hinder the development of new ventures and also provide an unsatisfactory experience for the student concerned.

As the interest in entrepreneurship grows so will the potential for students to receive a poor experience and conflict can arise within an institution if appropriate mechanisms for support are not put in place.

Whilst student and graduate entrepreneurship may contribute to third strand outcomes, including a financial return to the institution, this national research project focuses on the student perspective and how an optimal experience can be provided through the development of appropriate policies and practice.

Keywords: Intellectual Property, Enterprise, Commercialization, Higher Education, Third Strand, Postgraduates.