

**EMBEDDING INTELLECTUAL PROPERTY LAW
IN DUTCH AND BRITISH UNIVERSITIES:
INVENTOR JOHANN LIPPERSHEY AND HIS TELESCOPE**

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ABSTRACT

Whilst the Dutch inventor, Johann Lippershey was ultimately not successful in securing a patent for inventing the telescope in 1608, his failure to do so and specifically the reasons for his failure, should act as a cautionary tale as to why Universities in his country of origin the Netherlands and for the purposes of this paper, in the UK too, should provide their respective students with a comprehensive and coherent knowledge of IP so that they have the greatest chance of protecting and exploiting any intellectual property (IP) they do create once graduated. This paper examines what Dutch and British universities are doing to embed IP education in their respective curricula and whether the changing nature of their roles in society, has helped or hindered these universities in their ability to deliver IP education in the form that their student communities desire.

INTRODUCTION

For a patent application to be successful a patentee must ensure (amongst other criterion) that he is the first to file an acceptable application.¹ This first to file approach offers a number of benefits including avoiding the sometimes difficult question as to who was the first to invent (which arguably sits more comfortably with the natural rights theory underpinning patent law and many of the other IP rights that are common place today).² First to file is also credited with incentivising inventors to disclose their inventions as soon as is practicable because they could well be rewarded with a twenty year monopolistic right over the invention in return for disclosure.³ In essence, “...the first-to-file system...delivers rough, but simple justice”⁴ in comparison with the evidential and administrative difficulties often associated with the first-to-invent system.

This paper will use the example of the Dutch inventor Johann Lippershey, (who is widely credited with the invention of the telescope but who failed to secure a patent largely as a result of the first to file principle), as a salutary reminder to Dutch and British universities that the teaching of IP should form an integral part of their undergraduate and postgraduate curricula, particularly if they wish their students to be able to commercially benefit from their ingenuity and inventiveness. This paper will also review a selection of the current delivery models employed by both Dutch and British universities to educate their students about

intellectual property. Observations, where appropriate, will be made as to whether these methods are still fit for purpose and what additional delivery protocols could be deployed by higher education institutions in both countries as means of maximising the beneficial impact of IP curriculum on the student population at large.

JOHANN LIPPERSHEY: INVENTOR OF THE TELESCOPE

Widely credited with the invention of the telescope,⁵ Johann Lippershey still nonetheless failed to secure a patent for his efforts which he filed for in 1608. Of German origin, Lippershey settled in Middleburg, the capital of the province of Zeeland in the Netherlands, in 1594. It is at this stage that his eventual association with the telescope began. By 1608, his work as a spectacle maker and master lens grinder led him to apply to the States General of the Netherlands for a 30 year patent for his telescope which he named 'kijker' or 'looker'.⁶ The States General was the national government of the Netherlands at the time.

The following was an entry taken from documents originating from the archives of the States General, dated 2 October 1608.⁷

“On the petition of Hans Lippershey, spectacle-maker, inventor of an instrument for seeing at a distance, as was proved to the States, praying that the said instrument might be kept secret, and that a privilege for thirty years might be granted to him, by which everybody might be prohibited from imitating these instruments, or else grant to him an annual pension, in order to enable him to make these instruments for the utility of this country alone, without selling any to foreign kings and princes.”

Whilst this entry evidences that Lippershey applied for a patent⁸ what is not clear however is who or what inspired him to develop the telescope in the first place. Most accounts suggest that Lippershey was inspired by “...two children playing in his shop with some lenses and [they] noticed that, by holding two of them in a certain position, the weather-vane of the nearby church appeared much larger. [At this point] Lippershey...tried this out for himself and then improved it by mounting the lenses in a tube.”⁹ Other less common accounts suggest that Lippershey's apprentice held the lenses and not the aforementioned children, whilst alternative explanations imply that Lippershey ironically copied the idea from another optician.¹⁰

What is clear however was that Lippershey was not granted a patent but instead was issued with an annual pension which he himself had suggested as an alternative to a patent. In return for this pension, Lippershey promised not to sell the invention to foreign kings.¹¹

What is particularly interesting for the purposes of this paper were the reasons given by the States General as to why Lippershey could not be granted a patent. The main reasons were that others were also claiming ownership over the development of the telescope at the same time as well as the telescope concept itself already being in the public domain in Middleburg, the Netherlands and beyond. Principle amongst those asserting claims in addition to

Lippershey were Jacob Metius and Zacharias Jansen. Metius had also sent a petition to the States General in which he asserted that he had developed a telescope of at least equal power to Lippershey's but using less expensive materials than him.¹² Whilst Jansen, specifically his son, Hans, asserted that his father had in fact "invented the telescope in 1590 and used it to look at the moon and stars."¹³ Crucially however Hans' sister "gave either 1611 or 1619 as the date of invention" thereby undermining Jansen's credibility in terms of first to invent.¹⁴ It is perhaps easy to understand therefore why the States General did not grant Lippershey a patent; even if Lippershey had successfully defeated the first to invent claims of both Metius and Jansen, he would have found it impossible to counter the argument that in fact his telescope did not satisfy two of the three pillars of what we now term as the classic trinity of both Dutch and UK Patent law;¹⁵ the telescope was neither new or inventive given that there were versions of the telescope widely available not only in the Netherlands, but in France, Germany and Italy too.¹⁶

RATIONALES FOR TEACHING IP LAW IN UNIVERSITIES

Whilst Lippershey did not go entirely unrewarded for the invention of the telescope in the Netherlands (he was after all granted an annual pension for his efforts); it is worth noting albeit hypothetically, that if Lippershey had received guidance on how patent law and more generally how the IP framework in the Netherlands operated during his era; the outcome of his patent application to the States General could well have been different. Whilst later on in this section, the paper will argue that universities could do more to ensure their students understand the importance of IP education to their future economic prospects, it is worth stating at this point that during Lippershey's era (1570-1619), the two universities in existence in the Netherlands (Leiden and Franeker) did not have at the centre of their mission the employability of their students which Tomlison has argued is more of a 20th/21st century construct.¹⁷ Instead, these two universities according to Martin¹⁸ (and similar to other mediaeval universities of the period) had as their guiding principles the following two concepts. Teaching (in particular teaching select demographic groups such as priests and lawyers) and scholarship ("the systematic study and critical interpretation of existing knowledge."¹⁹) It is therefore perhaps unfair to superimpose too literally modern day ideals on mediaeval universities still in their infancy and therefore it should be perhaps considered normal institutional practice for Dutch universities not to have afforded Lippershey with any IP teaching nor any guidance on progressing his telescope patent; he was after all not even a student of either university.

Fast forward to today and the level of ingenuity and inventiveness displayed by Lippershey is arguably more common place amongst students in his jurisdiction, the Netherlands as well as the other country at the centre of this paper, the UK. Indeed, in 2006, Dutch universities in partnership with private organisations applied for 8,180 patents, whilst in the same year, UK universities applied for 6,656 partnership patents.²⁰ However there is little in the way of examinable data regarding the application rates for patents and indeed other registrable IP rights from students in either country. It is therefore perhaps timely at this juncture to consider the rationales as to why all modern era Dutch and UK universities should teach the

subject of IP to their respective student communities; particularly given that the option of an annual pension in lieu of a patent (or another IP right) no longer exists for university students except as a historical anomaly dating back to Lippershey's bygone era.

One of the primary reasons cited as to why universities should deliver IP curriculum to students is because of the beneficial impact intellectual property, or more specifically the protection and exploitation of IP has on the economies of the countries in which the universities are located and are significant stakeholders.²¹ As members of the European Union, both the UK and the Netherlands have benefited enormously from this IP 'premium.' By way of example, over the period 2011-2013, IPR intensive industries²² generated 42% of total economic activity (GDP) in the EU, with a monetary value of €5.7 trillion.²³ Similarly in terms of EU trade, both the UK and Netherlands helped to generate a trade surplus of €6.4 billion between 2011-2013.²⁴ Perhaps most significantly of all, given that one of the central 21st century missions of universities is to ensure their graduates are employable²⁵ upon completing their studies, IPR intensive industries not only directly generated 28% of all jobs in the EU but also paid significantly higher salaries than other industries, with a salary premium of 46%.²⁶ It is clear therefore that universities in both the Netherlands and the UK would do well on the basis of this headline economic data alone, to consider the integration of IP centric curriculum into their respective course offerings to prospective and existing students as a means of satisfying their employability and contribution to society agendas.

Another significant rationale that has been deployed to further the cause of IP education in universities has been the utilitarian social contract higher education model.²⁷ In its essence, this model focuses on universities addressing the industrial and societal needs of the population at large. For instance, utilitarians such as Jeremy Bentham were responsible for establishing University College London in 1826 "...specifically to meet the needs of a modern industrial society that had been ignored by Oxford and Cambridge Universities."²⁸ Utilitarianism is also well known to IP academics and practitioners alike; it has been used as a classic justification to further the development specifically of patent law; "...the primary focus of the patent system is on the disclosure of technical information for scientific and industrial reasons..."²⁹ In the context of Dutch and UK universities fulfilling their vision and mission, utilitarianism it is suggested offers a compelling reason as to why IP education should be at the centre of a university's value proposition. The study of IP will offer students for example, a 'quid pro quo' opportunity to patent their inventions for a twenty year period in return for disclosing their patent application to the public at large. As a result not only does the student benefit by being granted an IP right by the state; the state also benefits by gaining access on behalf of society to the patented invention.

For completeness it is perhaps appropriate to state that other justifications for IP rights (and therefore by extension, justification for such rights to be taught in universities) do exist. In relation to these justifications it is worth referring to Denoncourt's work³⁰ as these rights are not directly relevant to the narrative of this paper.

IP EDUCATION IN THE NETHERLANDS

In the Netherlands, approximately 100,000 master students can choose in the region of 800 courses, including 102 courses at nine law schools at general universities in Amsterdam, Groningen, Leiden, Maastricht, Nijmegen, Rotterdam, Tilburg and Utrecht. Formal LLM courses can contain IP rights education to some extent, but most academics teach their students about IP laws and legislation as opposed to IP rights; a subtle but yet important distinction.

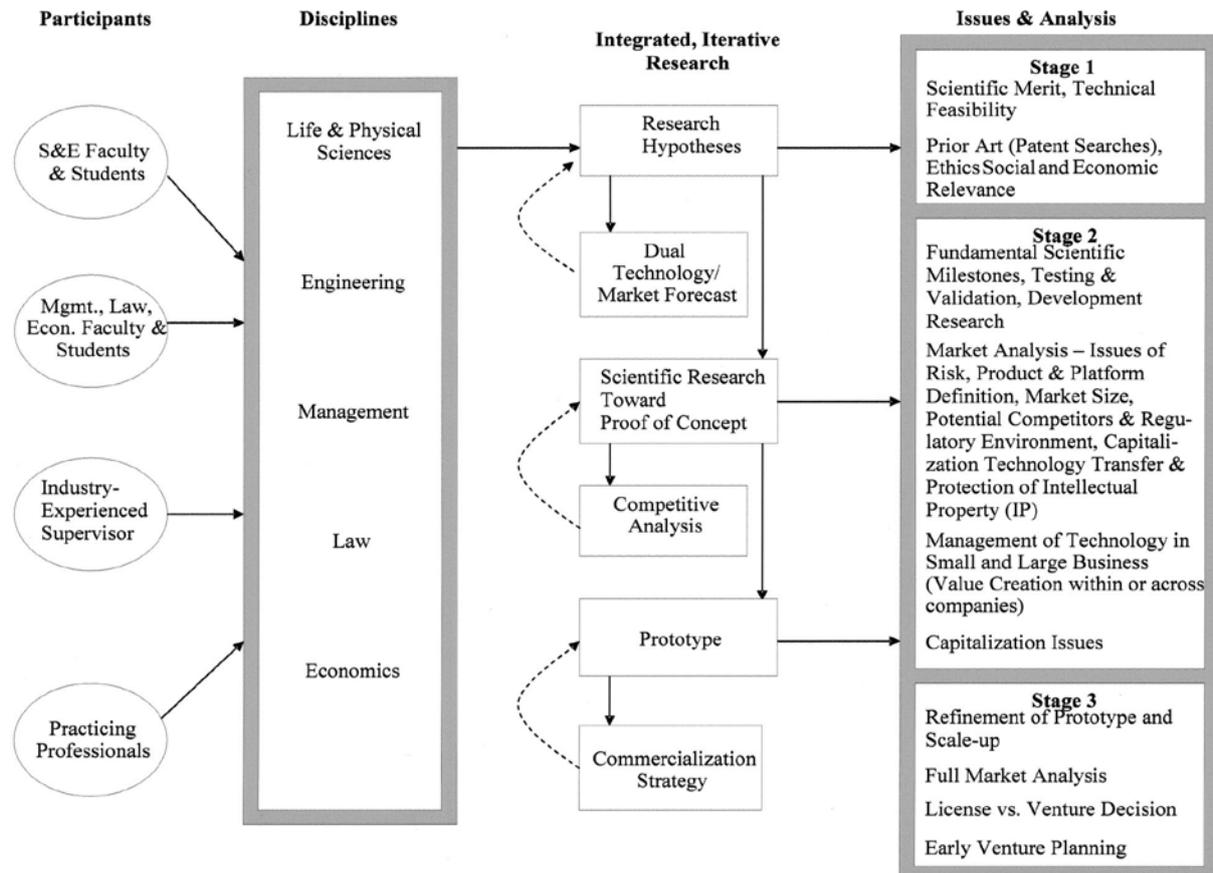
The content of the IP rights courses or units focuses largely on copyright, trademark and design law. This enables academics to utilise their experience from working in law firms with these specialisms. It is perhaps worth noting given the focus on Lippershey and his telescope earlier in the paper that only one masters course 'IP Law and Knowledge Management' at Maastricht University includes education on patents. At the other eight universities the teaching staff that deliver material on IP rights on the Commercial Law and Information Law units avoid instruction relating to patents and the legislative framework underpinning them. As such, the overwhelming majority of law schools in the Netherlands are unable to provide suitable in-depth learning opportunities relating to patents; a problematic situation in light of the importance attached to equipping students with employability attributes as part of a university's vision and mission.³¹

Beyond the confines of law faculties in the Netherlands, IP rights education is not an integral part of the curriculum offered by science, engineering, economics, business administration or medicine faculties either. It is submitted that this is another serious omission since students as future inventors, entrepreneurs and managers will not have access to essential IP rights information and might face the risk that they will learn what they need to know the 'hard way' (as Lippershey did) after graduation. Since convention dictates that individual Dutch academics have sole responsibility for the development of curriculum in accordance with the Humboldt social contract model³² which advocates inter alia, "a high level of autonomy [for] professors",³³ it is impossible for the Dutch Ministry of Education and Science or boards of directors of universities to impose changes to the IP rights education curriculum even if it is (in a utilitarian sense) in the interests of both the students and society at large.³⁴

However where Dutch government departments have had some success has been in utilising the Netherlands Patent Office (specifically by the Ministry of Economic Affairs) to provide IP services to Dutch universities since 2004. This has been a specific delivery priority for the Ministry in light of the importance it attaches to ensuring that both science graduates and academics receive integrated IP rights education as a means of ensuring these individuals have the ability to identify, protect and exploit the IP emanating from their project work or research.

Figure 1

Integrated IP Rights education for students and staff in scientific disciplines ³⁵



Since 2004, officials and account managers from the Netherlands Patent Office have coordinated and organised IP-centric lectures and other sessions for students at 40 faculties of engineering, science, economics, business administration and medicine including materials for PhD students at medical centres. These services have varied from guest lectures discussing the Dutch IP rights framework in an introductory sense to more specialist sessions providing important insights into for example, how to use IP databases and related issues such as managing and licensing IP rights once accrued. In all instances, the requests for these sessions emanate from academics from the aforementioned faculties and the IP content of such sessions is always aligned with the overarching themes of the electives or courses in which these sessions will sit; for instance the IP implications of products or services created in the fields of biotechnology, artificial intelligence and virtual reality by way of example. This observation again demonstrates the prevalence of the Humboldt social contract model in Dutch universities; with its emphasis on academic freedom and a significant level of personal autonomy for academics in the learning and teaching space. ³⁶ This 18th century German model focused on the concept of academic freedom for both students and academic staff.

Conceptually, it is based on the work of German/Prussian neo-humanists such as Wilhelm von Humboldt, Fichte and Schleiermacher. The notion of academic freedom focused on students learning for the sake of learning 'Lehnerfreiheit' and professors having the authority to study and teach whatever subjects they wanted; 'Lehrerfreiheit'. Martin cited the following essential elements of this model; "scholarly learning and humanistic education; training the bureaucratic and professional elite; generous funding by the state; the essential unity of teaching and research; and a high level of autonomy with professors and students free to seek truth and knowledge as they understood them." ³⁷ Since 2004, the number of students reached during these IP sessions has been approximately 1,500 per academic year.

Figure 2
Services delivered by the Netherlands Patent Office and the Benelux IP Office ³⁸

| Name | Contents | Target audience | Duration (hours) | Scientific disciplines |
|------------------------------|--|--|-------------------------|--|
| Lectures | IPR laws, procedures and ownership - copyright - patent - trademark Freedom to operate; Infringement; Enforcement of IPR; Costs of IPR; and Management of IPR | Students | 2 – 8 | Science, Technology (artificial intelligence, biotechnology, life sciences), Engineering ICT, Maths Economics, Business Administration |
| Presentations | Patentability of research results -IP requirements -MTA- -Use of notebooks -Freedom to Operate -Patent attorney -Publish and patent -Inventor vs. owner | Scientists and PhD students Project managers Deans | 1-2 | Science, Technology Engineering, Maths (STEM) |
| Presentations | Reasons to file patents and how to exploit them. Procedures, costs, licenses, sales, etc. | Scientists and PhD students TTO staff | 1-2 | Science, Technology Engineering, Maths (STEM) |
| Invention Disclosures | Use of IDF by scientists and TTO Patent searches and IPC | Scientists and PhD students TTO staff | 4-8 | Science, Technology Engineering, Maths (STEM) |

| | | | | |
|--|---|---|-----|--|
| Workshops: Use of Databases | Identification of patents for research proposals / market research -Google Patents -Espacenet -Patentscope -PatStat | Students, Scientists and PhD students TTOs University Librarians | 2-4 | Science, Technology Engineering, Maths (STEM) Economics, Business Administration |
| Management Games | Patents for TT at universities Patents in (open or closed) innovation processes with companies | Students and scientists Students TTOs Research funding organisations | 1-4 | Science, Engineering, Economics, Business administration |

In addition to offering the learning and teaching modalities above, the Netherlands Patent Office in collaboration with the Patent Academy of the European Patent Office (EPO) developed a product called the IP Roadmap. The overall aim of the Roadmap was to stimulate an awareness of IP amongst researchers as well as embed IP education into the curriculum of students in Dutch universities between 2010-2015. One of the key operational objectives of the Roadmap product was to involve decision makers from government, industry and the university sector and show them the growing importance of IP rights to the needs of students, academics and society in general. It is arguable that the Roadmap is evidence of the Triple Helix model³⁹ of university education in practice. This model is predicated on the assumption that universities should make a meaningful contribution to their country's economy; and that the best way to maximise this contribution is to forge "...closer links between universities, industry and government."⁴⁰ The Netherlands Patent Office and the EPO also assumed that by involving decision makers from government, industry and the university sector, these decision makers in turn could convey the importance of having knowledge of IP to academics and other stakeholders from their respective sectors. It was also hoped that the Roadmap would ultimately inspire professors and others with learning and teaching responsibilities, to redesign university course content so as to include IP education as the cornerstone of curriculum at both undergraduate and postgraduate level. However the results of the Roadmap initiative have been mixed. In accordance with the Humboldt social contract model,⁴¹ academics have not been inclined to change their course content on the scale that the Netherlands Patent Office and the EPO had hoped. It would therefore appear that academics at Dutch universities (along with their colleagues in other jurisdictions) are not prepared to relinquish their learning and teaching autonomy even at the behest of university senior management, perhaps reflecting a desire to protect against a perceived attempt to usurp their academic freedom and high level of personal autonomy; both classic characteristics of the Vannevar Bush social contract⁴² between universities and the state.

Compared to the aforementioned attempts to embed formal IP education into the Dutch university system by external actors including the Netherlands Patent Office and the EPO, other attempts have perhaps been more successful given that their focus has been on delivering informal IP education; education that does not necessarily result in a credit bearing award. Whilst only speculation at best, it is arguable that this informal approach has worked because it respects the underlying thesis underpinning the Humboldt and Vannevar Bush social contract models⁴³ so diligently adhered to by Dutch universities; namely informal, non credit bearing curriculum does not interfere with the academic independence and integrity of those working in learning, teaching and research roles.

Some examples of informal IP teaching that have been deployed at Dutch universities include the Turning Technology into Business course at Delft University of Technology; the Science Based Business course at Leiden University and Entrepreneurship in the Life Sciences at Venture Labs at Amsterdam University.⁴⁴ The annual attendance rate for these courses amounts to more than 600 masters students. One of the objectives of these courses is that students should be educated in how to transform their science and technology knowledge and expertise into innovations that can solve problems and thereby have a beneficial impact on society in the long term; clearly a knowledge of IP (particularly patents) forms a key part of achieving this objective. During these courses, a basic understanding of IP rights and the use of IP databases is integrated into the development of another course objective; the formulation of a business plan. Another observation to make about these courses is that students can start using academic patents from their respective universities as a means of solving problems facing society other than those for which the patents were originally granted for. At the conclusion of these courses a common assessment is for students to pitch their IP centric business plans to an external expert jury as a means of stress testing and validating the potential and commercial viability of their business propositions. As Tomlinson⁴⁵ argued any initiative that supports students managing the transition from higher education to the labour market would be welcomed and would prove popular. It is asserted that the aforementioned courses with their focus on IP in practice do just that.

In addition to the more conventional 'bricks and mortar' learning and teaching methodologies discussed above, a number of Dutch universities have also embraced the use of technology as a means of disseminating knowledge about IP to students in the Netherlands. The use of Massive Online Open Courses (MOOC) is an example of one such initiative. In the Netherlands a consortium of four Technical Universities (Delft, Eindhoven, Twente and Wageningen) has developed a new MOOC for a course on 'Entrepreneurship for Engineers' together with the Start-Up Delta initiative in Amsterdam. This MOOC delivers learning and teaching content to undergraduate students on various topics (including intellectual property) and the content is typically based upon the case study format; in other words using successful entrepreneurs who previously studied at these universities as the backdrop to understanding the theoretical and practical content embedded in each MOOC. The MOOC at the centre of this discussion 'Entrepreneurship for Engineers' covers the following content: (1) What does it take to become a "Technopreneur"? (self assessment); (2) How to identify business

opportunities (e.g. applying a problem / solution approach and using Google and EPO patent databases to generate ideas); (3) How to undertake market research for new ideas and innovations (e.g. using International Patent Classification codes in WIPO's Patentscope) and how to collate evidence for the viability of a business idea; and (4) How to develop the ability to translate a business idea into marketing and financial plans; (i.e. using patents, designs and trademarks as intangible assets for the purposes of such plans).

If participating students successfully pass the examination for this MOOC, they can then submit their application to enrol for the official MSc courses in Technical Entrepreneurship at one of the four universities referenced above. In the spring of 2017 some 20,000 students followed this MOOC and the four universities expect to enrol some five percent of these students on to their MSc courses in academic year 2017/ 2018.

INTELLECTUAL PROPERTY EDUCATION IN THE UK

The teaching of IP rights law as a subject in the UK has been part of the higher education curriculum for decades. A significant milestone was the publication of the seminal textbook by Professor William Cornish in 1981 entitled "Patents, Copyrights, Trademarks and Allied Rights."⁴⁶ As Soetendorp⁴⁷ stated, the publication of this book plus "...the need for IP expertise to resolve computer software based disputes" led to a demand for IP legal education in the early 1980's. Soetendorp also identified a number of other economic and industrial developments that led to the consolidation of this demand. In her work she noted: (1) that STEM graduates may wish to pursue careers as patent attorneys and patent examiners; (2) the rise in importance of IP or intangible assets on corporate balance sheets; (3) the advent of the Internet which has resulted in an explosion of technology based companies; and (4) the rise of entrepreneurship as a legitimate career destination for university graduates which requires the critical aspects of a business idea to be legally protected in order to ensure the survival of the resulting business beyond the average three year startup life span.⁴⁸

Soetendorp's analysis has been endorsed by Gubby.⁴⁹ What is most interesting however is how UK universities have responded to this demand for IP education. In general terms, UK universities have adopted a narrow construction of this wide-ranging and multifaceted demand; they have primarily placed IP education in law schools as a means of facilitating the training and development of students wishing to practice as IP lawyers.⁵⁰ It is arguable that this approach is not only overly restrictive given that students from other degree disciplines should understand the subject of IP (and not just those wishing to practice as lawyers)⁵¹ but is also very reminiscent of the approach this article first discussed in relation to Lippershey and the mediaeval universities of his era;⁵² "[universities are there]...to [simply] produce trained professionals equipped with useful knowledge and skills..."

At undergraduate level it can be asserted with some confidence that UK universities place a duty on their law schools "...to offer an intellectual property law elective as part of the undergraduate law degree. Intellectual property is usually taught in the second or final year

as a full credit bearing option module.”⁵³ It is at postgraduate level however where we see this narrow ‘Lippershey era’ approach to IP education in full prominence. Nineteen of the UK’s leading universities offer a combined total of 28 predominantly law masters degrees that offer IP as a substantial part of the course content.

Figure 3
Postgraduate Law Degrees offered by UK Universities⁵⁴

| University | Postgraduate Degree |
|---------------------------------|---|
| Aberdeen | Intellectual Property Law LLM |
| Bangor | International Intellectual Property Law LLM |
| Bournemouth | 1. Intellectual Property Law LLM 2. Intellectual Property PGCert |
| Brunel | 1. Intellectual Property Law PGCert 2. International Intellectual Property Law LLM |
| Cardiff | Intellectual Property Law LLM |
| Derby | Intellectual Property and Information Technology Law LLM |
| East Anglia | Information, Technology and Intellectual Property Law LLM |
| Edinburgh | Intellectual Property Law LLM |
| Glasgow | 1. Intellectual Property, Innovation and the Creative Economy MSc 2. Intellectual Property and the Digital Economy LLM |
| Kings College London | 1. Intellectual Property and Information Law LLM 2. Copyright Law (UK, US and EU) PGDip 3. Copyright Law (UK, US and EU) MA |
| Leeds | Intellectual Property Law LLM |
| Oxford | Intellectual Property Law and Practice PgDip |
| Manchester | Intellectual Property Law LLM |
| Nottingham Trent | 1. Intellectual Property Law LLM 2. Trade Mark Practice Professional Certificate |
| Queen Mary University of London | 1. Intellectual Property (Management of Intellectual Property) MSc 2. Intellectual Property Law LLM 3. Trade Marks Law and Practice PGCert 4. Intellectual Property Law PGCert |
| Reading | Intellectual Property Law and Management LLM |
| University of West London | International Studies in Intellectual Property Law LLM |

| | |
|---------|--|
| Sussex | Information Technology and Intellectual Property LLM |
| Swansea | Intellectual Property and Commercial Practice LLM |

The limitations of this narrow ‘mediaeval social contract’⁵⁵ approach to IP education, “the primary task of [which] was to train an elite with the knowledge and skills needed to serve in the...legal professions”⁵⁶ has been identified by a number of scholars⁵⁷ and non governmental organisations.⁵⁸ Gubby for instance suggested that “an understanding of IP should not be confined to the graduates of law schools. In an economy increasingly based on intangible assets, it is not only trained lawyers that are required, but also IP trained managers [as they] need to be able to identify IP [as well as have] the competence to assess when and how to protect that IP.”⁵⁹ In a similar vein, a report produced by the National Union of Students (NUS) in partnership with the UK IP Office (UKIPO) and the Intellectual Property Awareness Network (IPAN)⁶⁰ found that UK students in general terms lacked knowledge of intellectual property and its importance to their future careers. In particular this report identified that many students had a poor grasp of key intellectual property rights such as design rights and copyright. The students in this report also expressed concern that the teaching of intellectual property was generally limited and that they would prefer the teaching of this subject to be more closely aligned to their degree disciplines. It is suggested that this last observation is significant, given that it supports the assertion made in this paper that universities by simply focussing the majority of their IP education efforts on law students in law schools are not only perpetuating a narrow ‘mediaeval social contract’⁶¹ view of what IP education should be for but also perhaps ignoring the needs of other student cohorts within the university.

Whilst the prevalent and somewhat problematic delivery model adopted by UK universities is to deliver IP education through the auspices of Law Schools, there are however embryonic signs that universities are recognising the limitations of this approach and are expanding the remit of IP education beyond law schools to other faculties and using innovative delivery models to achieve this. UK universities for instance are using the concept of clinical legal education and pro bono clinics as a means of disseminating IP knowledge from law students and law schools to students needing advice and guidance about their IP rights in a given situation. This model has proved successful where adopted; as it uses experiential learning to convey IP knowledge which would otherwise be communicated in more traditional lecture and seminar modalities.⁶² This approach also has other benefits for UK universities. Firstly it supports the concept of graduate employability which Tomlinson views as an integral part of a University’s mission.⁶³ It also enables universities to claim with some confidence that they are addressing the industrial and societal needs of the population at large in a utilitarian social contract sense;⁶⁴ as they are developing graduates with a knowledge of IP which Gubby and Soetendorp have both acknowledged as essential to the current and future needs of a society increasingly based on intangible as opposed tangible assets.

Another feature of IP education in the UK is the active role that the UKIPO plays in disseminating IP knowledge in its own right as well as supporting UK universities, schools

and colleges in this regard. The UKIPO has developed a number of initiatives including the following:

Figure 4

UKIPO Public Education Initiatives

| |
|-------------------------------------|
| IP Tutor and IP Tutor Plus |
| IP for Research |
| Lambert Toolkit for Universities |
| Intellectual Asset Management Guide |
| Case Studies |
| Future Innovators Toolkit |
| Cracking Ideas |
| Think Kit |

Arguably, this co-existence approach with its emphasis on closer links between universities and government agencies enables universities to undertake “...a new third mission of contributing to the economy” or as Martin referred to it; the Triple Helix model role for universities. A role in addition to the requirement to teach and undertake research.⁶⁵

Role of University of Portsmouth's Technology Transfer Office (TTO) in IP Education

The UKIPO is taking steps to execute the IP education objectives as set out in Goal 4 of its 2017-2020 Corporate Plan⁶⁶ to help create and deliver a range of IP centric initiatives and resources to assist universities. UK universities are also engaging with the latent demand for IP literacy from their various stakeholders including their student cohorts by offering IP curriculum and a range of support services aimed at specific student groups with specific IP needs (e.g. student entrepreneurs and how to protect their business ideas). The University of Portsmouth, through its TTO is a case in point. It has had some success in recent years in securing funding from the UKIPO. This has included £30,000 to establish an IP Clinic to assist student entrepreneurs with any IP issues resulting from their business ventures; and a further £75,000 in order to create a knowledge exchange campus between itself, Southampton and Bournemouth universities as a means of helping regional SMEs exploit their IP.⁶⁷

However, whilst these initiatives are welcome and demonstrate some synergistic equivalence to programmes delivered in the Netherlands, it is the view of the authors that UK Universities could do more at an individual institutional and 'joined-up' basis to meet the current and anticipated need for IP literate graduates. This is particularly important if the UK wishes to embrace the economic and social opportunities resulting from the major technological changes facing society including for instance the increasing adoption of artificial intelligence.⁶⁸ Universities could for example, consider mandating the delivery of IP curriculum to all undergraduate and postgraduate students at various entry points. Universities could also consider recruiting IP academics with faculty centric specialisms. Similar to entrepreneurs in residence⁶⁹, whereby universities recruit entrepreneurs to provide start-up support and mentoring primarily to their students and graduates; universities could also introduce a similar scheme but for IP academics. For instance an IP academic with an expertise in copyright and design rights could be beneficial 'in residence' in a faculty with art, design and media courses; whilst an IP academic with a background in patents could be

‘in residence’ in a faculty with engineering curriculum. This proposal could also address two key issues which are currently limiting the impact of IP education across UK university campuses; universities relying on too few academics to deliver the subject of IP and a lack of IP knowledge in students graduating from faculties delivering primarily STEM, creative as well as business and law centric curriculum.⁷⁰

In relation to 'joined-up' institutional thinking one observation that can be made about the university delivery models evaluated by Martin is that they all focus primarily on universities delivering their various educational objectives as standalone organisations, almost in 'splendid isolation' of each other.⁷¹ It is perhaps appropriate therefore to consider the development of a new model or at the very least the inclusion of an additional principle in the existing models as a means of better assisting universities meet their obligations under their respective social contracts with the state and society at large. Adopting the 'Autonomous Interdependence' (AI) principle could lead to universities collaborating far more with one another (i.e. interdependence) on issues of strategic importance to the state and society at large (i.e. reinforcing the social contract). In addition, assisting one another where there was a fulfilment gap; for instance university X providing university Y with academic resource and/or strategic direction relating to the delivery of IP curriculum and associated initiatives. The benefit of this approach is potentially that a university's freedom in all matters would not be curtailed; each institution would remain autonomous (thereby respecting the historical narrative of previous university models with their focus on academic freedom). However, AI would place greater emphasis on universities working collaboratively, both strategically and operationally, to achieve desired institutional and societal outcomes. It is arguable that as a conceptual model, AI could potentially assist universities achieve far more in the IP education space than working alone.

Broadening participation in IP education via Massive Open Online Courses (MOOCS)

A relatively recent introduction in the educational arena has been the development of massive open online courses or MOOCS as they are commonly called.⁷² Covering a broad range of subjects and disciplines, approximately 78 million learners had enrolled for at least one MOOC by the end of 2017.⁷³ Various factors have contributed to the popularity of MOOCS. They offer students the opportunity to study high quality courses online with prestigious universities without having to pay fees (or limited fees) or meet any formal entry requirements. Further, attendance at university campuses is not necessary as delivery is exclusively online, allowing students to combine these courses with their existing commitments. In terms of UK universities and their footprint in this space, many UK universities deliver MOOCS via 'FutureLearn', a private company owned by The Open University. 'FutureLearn' is also the delivery partner for a number of overseas universities.

Figure 5
Selection of MOOC Providers⁷⁴

| UK Universities via Future Learn | Overseas Universities Via Future Learn | Commercial / Other Providers (Country of Partner Universities) |
|--|---|---|
| Aberdeen, Bath, Brimingham, | Auckland, Cape Town | British Council, British Film Institute, British Library, British Museum |
| Dundee, East Anglia, Edinburgh | Fudan, Monash | London School of Hygeine and Tropical Medicine |
| Exeter, Glasgow, Kings College | Oslo, Shanghai International Studies University | Coursera, Desire2Learn (worldwide), |
| Lancaster, Leeds, Leicester | Shanghai Jiao Tong University | Udemy (individual instrutors) |
| London, Liverpool, Loughborough | Sung Kyun Kwan University | Udacity (USA) |
| Newcastle, Nottingham, Open | Tel Aviv, Trinity College Dublin | EdX (USA, Australia, Netherlands) |
| Queen's, Reading, Royal Holloway | Yonsei | MOOEC (Australia), EduKart (India), ALISON (Ireland), Aprentica (Latin America) |
| Sheffield, Southampton, Strathclyde, Warwick | Groningen | National Film and Television School |

Whilst the number of MOOC subscribers and MOOC providers is impressive by any metric, the number of MOOCS relating to IP is limited in relative terms.

Figure 6
Intellectual Property MOOCS⁷⁵

| Provider | Course |
|-----------------|---|
| Udemy | Intellectual Propertry Toolkit |
| Udemy | Must-Know IP Law (Patent, Trademark and Copyright) |
| Udemy | Intellectual Property: Inventors, Entrepreneurs, Creators |
| Coursera | Patenting in Biotechnology |
| Coursera | Protecting Business Innovations via Copyright |
| Coursera | Protecting Business Innovations via Trademark |
| edX | Intellectual Property Rights: A Management Perspective |
| Desire2Learn | Foundations of IP Strategy |
| Udemy | Intellectual Property Strategy |
| Udemy | Copyright Basics: How to Protect Your Work from Piracy |
| edX | Intellectual Property Law and Policy – Part 1: IP and Patent Laws |

It is reasonable to assert that a greater variety of IP centric MOOCs could be deployed as a means of educating a global audience on the importance of IP to their career and business goals. IP MOOCs could also assist subscribers understand the classic quarternity of IP education; how to identify, protect and commercialise (and therefore not infringe) IP by delivery of course content focussing on the numerous IP rights available to creators of IP.

CONCLUDING REMARKS

In conclusion, universities in both the Netherlands and the UK could deliver IP curriculum to a more diverse range of students and redirect their fixation with teaching the subject of IP only to undergraduate and postgraduate law students. There is a societal imperative to do this; both the Netherlands and the UK are rapidly moving towards a purely knowledge-based economy where the value of a company's IP or intangible assets is significantly higher than the value of its tangible assets. Without basic IP rights education, university students will be at a distinct disadvantage if they do not understand the nature of IP rights and more importantly, lack the knowledge and skill to identify, protect and commercialise these assets for themselves or for their employers. In mitigation, there exist a number of underlying almost philosophical reasons as to why universities have not embraced the subject of IP more enthusiastically as part of their student curriculum; however it is the opinion of the authors of this paper that unless universities change their mindset towards IP curriculum, other stakeholders in the educational space will emerge to statisfy this ever growing need.

¹ L Bently and B Sherman Intellectual Property Law (Oxford University Press, 2014)

² A Mossoff 'Rethinking the development of patents: an intellectual history, 1550-1800' (2001) 52 Hastings LJ 1255, 1259-1276

³ Anon, "Prior Art in Patent Law' (1959) 73 Harv L Rev 369, 380.

⁴ L Bently and B Sherman Intellectual Property Law (Oxford University Press, 2014)

⁵ H King The History of the Telescope (Dover Publications, Inc, 2003)

⁶ R Dunn The Telescope (Conway , 2011)

⁷ H King The History of the Telescope (Dover Publications, Inc, 2003)

⁸ H King The History of the Telescope (Dover Publications, Inc, 2003)

⁹ H King The History of the Telescope (Dover Publications, Inc, 2003)

¹⁰ R Dunn The Telescope (Conway , 2011)

¹¹ H King The History of the Telescope (Dover Publications, Inc, 2003)

¹² H King The History of the Telescope (Dover Publications, Inc, 2003)

¹³ H King The History of the Telescope (Dover Publications, Inc, 2003)

¹⁴ H King The History of the Telescope (Dover Publications, Inc, 2003)

¹⁵ Article 2, Chapter 1. General Provisions. Kingdom Act 15 December 1994, containing rules in respect of patents (the Dutch Patents Act); s.1(1) Patents Act 1977

¹⁶ H King The History of the Telescope (Dover Publications, Inc, 2003)

¹⁷ M Tomlinson 'Graduate Employability: A Review of Conceptual and Empirical Themes' (2012) 25, 4, Higher Education Policy, pp 407-431

¹⁸ B Martin 'Are universities and university research under threat? Towards an evolutionary model of university speciation' (2012) 36, 3, Cambridge Journal of Economics, pp 543-565

¹⁹ B Martin 'Are universities and university research under threat? Towards an evolutionary model of university speciation' (2012) 36, 3, Cambridge Journal of Economics, pp 543-565

²⁰ D Butterman and VSNU Bureau, Research Universities in the Netherlands (VSNU, 2007)

²¹ EPO and EUIPO Intellectual Property Rights Intensive Industries and Economic Performance in the European Union (EPO and EUIPO, 2016)

²² IPR intensive industries are defined as those having an above average use of IPR per employee. Source: EPO and EUIPO Intellectual Property Rights Intensive Industries and Economic Performance in the European Union (EPO and EUIPO, 2016)

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- ²³ EPO and EUIPO Intellectual Property Rights Intensive Industries and Economic Performance in the European Union (EPO and EUIPO, 2016)
- ²⁴ EPO and EUIPO Intellectual Property Rights Intensive Industries and Economic Performance in the European Union (EPO and EUIPO, 2016)
- ²⁵ M Tomlinson 'Graduate Employability: A Review of Conceptual and Empirical Themes' (2012) 25, 4, Higher Education Policy, pp 407-431
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- ²⁹ L Bently and B Sherman Intellectual Property Law (Oxford University Press, 2014)
- ³⁰ J Denoncourt 'The creative identity and intellectual property' (2016) 25, Nottingham Law Journal, pp 39-54
- ³¹ M Tomlinson 'Graduate Employability: A Review of Conceptual and Empirical Themes' (2012) 25, 4, Higher Education Policy, pp 407-431
- ³² B Martin 'Are universities and university research under threat? Towards an evolutionary model of university speciation' (2012) 36, 3, Cambridge Journal of Economics, pp 543-565
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- ⁴⁰ ibid
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- ⁴² B Martin 'Are universities and university research under threat? Towards an evolutionary model of university speciation' (2012) 36, 3, Cambridge Journal of Economics, pp 543-565
- ⁴³ B Martin 'Are universities and university research under threat? Towards an evolutionary model of university speciation' (2012) 36, 3, Cambridge Journal of Economics, pp 543-565
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- ⁵³ R Soetendorp 'Developing the curriculum for collaborative intellectual property education' 2006
- ⁵⁴ Postgraduate Intellectual Property Courses in the UK
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- ⁶¹ B Martin 'Are universities and university research under threat? Towards an evolutionary model of university speciation' (2012) 36, 3, Cambridge Journal of Economics, pp 543-565
- ⁶² C Sylvester 'Bridging the Gap? The effect of Pro Bono Initiatives on Clinical Legal Education in the UK (2003) Journal of Clinical Legal Education, pp 29-40
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- ⁶⁶ Goal 4 of the UK Intellectual Property Office's Corporate Plan 2017-2020: "We will develop high quality IP based learning resources that support the national curriculum and higher education courses in subject areas identified by teachers
- ⁶⁷ UK IPO 2012 Fast Forward Competition winning entries www.ipo.gov.uk/fastforward.htm
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- ⁷¹ Splendid isolation' A term originally used to describe British foreign policy during the late 19th century under the Conservative premierships of Benjamin Disraeli and Lord Salisbury. It was a policy focused on avoiding alliances and entanglements. By analogy most universities in relation to their educational mission, work on this basis. Working or partnering with other universities is largely adhoc and on an initiative by initiative basis; the delivery of IP curriculum by universities at present is no different in this regard.
- ⁷² The 'modern' MOOC movement can trace its birth back to late 2011 when the first Standford MOOCS took off. 'By The Numbers: MOOCS in 2017' <<https://www.class-central.com/report/mooc-stats-2017/>> accessed 10 February 2018
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