Intellectual Property: How Well Undergraduate Students Aware of?

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***Abstract*—The massive worldwide growth in knowledge economy has led to an increase in the use of intellectual property. The protection of it can help to encourage the creation of new works by giving creators the control of and the rewards from their hard work. In the commercial side, intellectual property assets become more valuable to business. There is an increasing need to protect them in order to make the business success. In order to develop Hong Kong as an intellectual property trading hub in Asia-Pacific region, the Intellectual Property Department conducted a lot of studies on IP trading and management, workforce engaged in them and the public's awareness of the intellectual protection rights. However, there is a lack of studies in Hong Kong students' awareness and knowledge of intellectual property. The purpose of this study aims to explore Hong Kong undergraduate students' existing awareness of intellectual property and knowledge of copyright.**

***Index Terms*—Intellectual property, copyright, gender difference.**

I. Introduction

The massive worldwide growth in knowledge economy has led to an increase in the use of Intellectual Property (IP) which is a term for any intangible asset, such as concepts, designs, inventions, software, brand names and artistic works. It can be protected by copyright, trademark, patent, designs or other legal measures [1]. The protection of intellectual property can help to encourage the creation of new works by giving creators the control of and the rewards from their hard work. In the commercial side, providing the necessary intellectual property rights protection to investors can assure them of a free and fair environment for doing business [2]. With the increasing importance of intellectual property rights (IPR) and their protection, United Nations established a specialized agency, the World Intellectual Property Organisation (WIPO) with the mission of leading the development of a balanced and effective international intellectual property system that enables innovation and creativity for the benefit of all [3].

As intellectual property rights play a significant role in business and academia, a lot of research on intellectual property can be found in literature. IP awareness was the most popular topic among these studies. Tinao *et al.* conducted a survey in Bataan Peninsula State University to examine the attitudes towards, awareness of and aspirations for IP among the students and faculties [4]. Ong *et al.* designed a five-point Likert scale questionnaire to investigate the perception and awareness of intellectual property rights among the undergraduate students in Malaysia [5]. Villasenor carried out an informal study to assess the IP awareness of his graduate engineering students at UCLA and recommended that universities should give more attention to IP education, particularly to the graduate students in science, technology, engineering and mathematics disciplines [6]. As the use of digital resources has grown over the years, plagiarism has become a more and more important issue in academia, the Intellectual Property Office (IPO) and the Education Group of the Intellectual Property Awareness Network (IPAN) commissioned an empirical research to explore student attitudes towards, awareness of and aspirations for, IP in higher education and further education institutes in UK [7]. Cheema et al. believed that due to the unawareness of copyright infringement, plagiarism became a common phenomenon among students. Hence, they conducted a study to find the conceptual awareness of research students about specific terminologies of, types of and penalties of plagiarism at a university in Pakistan [8]. Starkey *et al*. surveyed technology teachers and students in New Zealand schools to assess their understanding of IP process. Their findings reflected an awareness of relevant concepts, but there was confusion among some IP key terms such as registered design, copyright and patents [9]. Carter *et al.* undertook a survey on faculty members from academic research libraries to study the effect of publishers' IP policies and institutional promotion and tenure process on their publishing decisions [10]. Other than IP awareness, researchers also studied IP education. Mok *et al.* derived preferred attributes for IP education from the perspective of the researchers in private and public institutions and university employees in Korea using conjoint analysis [11]. MacDougall surveyed a small number of IP outreach organisations around the world to establish benchmarks against international best practice in IP information dissemination to the public and clients [12].

As the knowledge economy rapidly increases, intellectual property rights become more valuable and play a major role in business. Hence, it also attracts much research from academia. Pikethly constructed IP awareness scales and conducted a large IP awareness questionnaire survey in 2006 to give a benchmark indication of the state of IP awareness across all sizes of firm and all sectors of industry in UK [13]. His findings also show that larger firms owned more intellectual property rights and tended to have a greater awareness of IP while SMEs and micro-enterprises were unaware of IP and promotion of IP awareness was crucial to help them preserve the IP created by them [14].

Recognising the importance of the contribution of IP creation makes to the economy, the Government of Hong Kong SAR has been involved in an on-going effort to assure

Manuscript received July 10, 2019; revised November 12, 2019.

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doi: 10.18178/ijke.2019.5.2.121

the business investors in Hong Kong can get their intellectual property rights protected [15]. In order to develop Hong Kong as an IP trading hub in Asia-Pacific region, the Intellectual Property Department (IPD) commissioned a research service provider to collect opinions and quantitative information on IP trading activities conducted by establishments in IP-related industries [16]. IPD also commissioned another research service provider to conduct a survey to collect information on the current landscape of the workforce engaged in IP trading and management activities in order to have a better understanding of the manpower in IP trading and management [17]. With the intention of keeping track of the business's and public's awareness of the intellectual protection rights, the IPD has been conducting surveys on business attitudes towards IP recurrently since 2004 and surveys on public awareness of IP right protection regularly since 1999 [18]-[21]. All these findings are useful to the Government in making policies regarding the promotion and development of IP trading in Hong Kong. Though some research on business's and public's awareness of the intellectual protection rights, IP trading activities and workforce engagement has been conducted in Hong Kong by IPD, there is a lack of studies in Hong Kong students' awareness and knowledge of IP. In view of the limited studies in this aspect, this study aims to explore Hong Kong undergraduate students' existing awareness of IP and knowledge of copyright.

II. The Study

This study was conducted through a self-administered survey. A questionnaire was developed with reference to the works and findings from literatures on IP and the promotional materials and learning aids published by IPD [22]. The questionnaire consisted of three parts. The first part collected students' demographic information. The second part was a list of questions to test students' knowledge on the available types of IP while the last part contained a list of statements to assess students' understanding of copyright protection.

The questionnaire was administered at the end of the classes and the participation was voluntary. The study sample included 155 undergraduate students of which 68 and 84 were males and females respectively and three students did not indicate their gender. They were from six faculties and schools and scattered from Year 1 to Year 4 of study.

III. Results and Discussion

TABLE I: How Well Students Knew the Available Types of IP

IP type	Correct answer	Incorrect answer	Do not know
Copyright	74.3%	16.1%	9.6%
Design	59.6%	23.5%	16.9%
Patents	64.2%	24.1%	11.7%
Trademarks	57.1%	37%	5.9%

The questions in the second part of the questionnaire tested how well the students knew about the available types of IP. Table I shows that copyright was the best known IP type. 74.3% of the students could answer the question related to copyright correctly. This result is expected as all freshmen of the university under study were required to complete the Academic Integrity Online Tutorial which was designed to promote academic integrity. After going through all the tutorial modules, students needed to complete a quiz with at least 80% score in order to pass this tutorial. One of its tutorial modules was about copyright issues. Hence, most of the students had learned about copyright before they completed the questionnaire for this study.

Patent (64.2%) was the second best known type by students and followed by design (59.6%) and trademarks (57.1%). Students' knowledge on these three IP types is acceptable. This may be attributed to their participation in the events and activities organized by the Knowledge Transfer Office which is committed to assist in patent application and commercialization of the university inventions, to promote the awareness of the protection of intellectual property and to nurture in-campus entrepreneurship development. Further analysis reveals that students from Business School got a much higher percentage of giving the correct answer in copyright (92.3%), patent (90.9%) and trademark (87.5%) than the overall percentage shown in Table I. As intellectual property assets become more valuable to business, they need to be protected in order to make the business success. It is believed that business students may be more aware of the available IP types.

The third part of the questionnaire consisted of 10 statements concerning copyright protection and some of statements were scenario based. Students were asked to determine whether the statement was true or false and the "I do not know" option was also provided. Table II indicates that the students' overall knowledge of copyright protection was good as over 65% of the students could give correct answer to 7 statements. However, attention should be paid to the other 3 statements with the low correct answer percentages. Statement 10 "It is an infringing act to upload a photo taken by your friend to your website for public access without his/her permission" was the statement with the third lowest correct answer rate (51.9%). As youngsters might like to share their items with their friends, friendship could reduce their awareness of copyright ownership.

Statement 2 "There is no need to register copyright" and statement 7 "If a teacher is employed full-time at a school, the copyright in the class presentation slides created for teaching use in his/her school normally does not belong to him/her" were the least (19.5%) and second least (39.5%) answered correctly by students. This is not a surprise to have statement 2 being the statement with the lowest correct answer percentage because the ownership of the other IP rights needs to go through some registration process, but copyright is automatically granted at the moment the work is created. This may make students confuse that copyright also needs registration. Another possible explanation is that the copyright issues module of the university's Academic Integrity Online Tutorial does not explicitly mention that the copyright is automatically generated. For statement 7, students received unsatisfactory performance could be because the university's Academic Integrity Online Tutorial focuses on students' academic study rather than teachers' work. Hence, they might not have a clear picture on this issue.

TABLE II: HOW WELL STUDENTS UNDERSTOOD COPYRIGHT PROTECTION

	Statements	Correct answer	Incorrect answer	Do not know
1.	An idea in your mind is protected by copyright.	75.3%	17.5%	7.1%
2.	There is no need to register copyright.	19.5%	77.3%	3.2%
3.	Works can be copied freely if they do not bear any statement or logo showing that they are protected by copyright.	67.1%	22.6%	10.3%
4.	The exclusive copyright of an author lasts forever.	69.7%	18.7%	11.6%
5.	Restaurants can legally play music to their customers without the permission from the music copyright owner.	65.6%	20.1%	14.3%
6.	If you use a recipe book to make a meal without asking for permission from the book author, copyright in the book is not infringed.	53.2%	34.4%	12.3%
7.	If a teacher is employed full-time at a school, the copyright in the class presentation slides created for teaching use in his/her school normally does not belong to him/her.	39.4%	42.6%	18.1%
8.	The copyright in your term paper belongs to you. The university cannot publish it without your permission.	67.1%	23.9%	9.0%
9.	For educational purpose, teachers can scan the whole textbook and post it to the Internet for their students.	74.2%	14.8%	11.0%
10.	It is an infringing act to upload a photo taken by your friend to your website for public access without his/her permission.	51.9%	33.1%	14.9%

Note: Percentages may not add up to 100 due to rounding of figures

As a substantial body of gender research exists in different areas such as learning styles [23], computer science course taking [24] and ICT awareness [25], the authors were also interested to study whether there was any gender difference in the awareness of IP. Hence, further analysis was performed using inferential statistics to compare the students' overall awareness score by gender. A score was assigned to each question/statement in the second part and third part of the questionnaire. The scores gained by individual student in each question/statement in the respective part were summed to represent the student's overall awareness/knowledge in the corresponding IP that the part was assigned to assess.

TABLE III: T-TEST COMPARISON OF STUDENT AWARENESS SCORE ON AVAILABLE TYPES OF IP BY GENDER

	Male (n=66)	Female (n=79)	t-value	$P < .05$	Effect Size
Mean	2.42	2.15	1.18	NS	0.237
SD	1.35	1.42			

Table III exhibits that there was no statistically significant difference between male students and female students in IP type awareness though the male group had a slightly higher IP type awareness mean score than the female group. It may be explained by the attribution to chance.

TABLE IV: T-TEST COMPARISON OF STUDENT SCORE ON UNDERSTANDING OF COPYRIGHT PROTECTION BY GENDER

	Male (n=68)	Female (n=84)	t-value	$P < .05$	Effect Size
Mean	5.69	5.95	-.80	NS	0.130
SD	1.99	2.01			

It is shown in Table IV that female student group had a slightly higher copyright protection knowledge mean score than the male students. Since this mean difference was not significant, attribution to chance may be one of the explanations. Another possible explanation may be that female students paid more attention to study the copyright issues module of the Academic Integrity Online Tutorial. Students were asked in the questionnaire if they would like to learn more about IP knowledge. The percentage (58.3%) of female students was higher than that (39.7%) of the male students regarding the keenness to learn more about IP. It indicates that female students were more eager to learn and it comes as no surprise that they would put more effort in studying the module materials.

IV. CONCLUSION AND RECOMMENDATIONS

This study examined the awareness of IP among undergraduate students in Hong Kong. It was found that copyright was the best known IP type among patent, design and trademarks. About three quarters of the students could answer the questions concerning copyright correctly. Further analysis reveals that students from Business School got a much higher percentage of giving the correct answers in the questions related to copyright, patent and trademark than the overall averages. This may be due to the reason that they paid more attention to IP as it had become a valuable asset in business. Another analysis results show that students had a good overall knowledge of copyright protection. However, many of them did not aware that copyright does not require registration. Statistical analysis results reveal that there was no significant difference between male students and female students in IP type awareness and knowledge of copyright protection.

Regardless of the small sample taken in one university, the above findings can only be considered as preliminary and provide an insight for further studies. Similar research can be repeated in other universities and higher education institutions in order to confirm the findings. As reported above, about 80% of the students did not aware that copyright is generated automatically once the work has been created, further education on this is recommended. Since the importance and value of intellectual property rights are increasing, there will be a strong need to incorporate IP education into university learning programmes especially those technology and business programmes. The launch of the Academic Integrity Online Tutorial for all freshmen in the authors' university is a good starting point. However, it is only focused on academic honesty such as plagiarism, copyright, falsification and fabrication. It is suggested to enrich this tutorial to cover other aspects of intellectual property.

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