Faculty Views of Undergraduate Intellectual Property Policies and Practices

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ABSTRACT

This study investigated faculty attitudes related to IP policies and practices associated with educating and guiding undergraduate students in intellectual property (IP) development in light of their increased involvement in research and entrepreneurial activities. We surveyed a sample of 143 faculty members from both engineering and entrepreneurship education to examine: (a) the extent and nature of faculty involvement in undergraduate IP; (b) issues confronting faculty as they relate to undergraduate IP; (c) indicators of success; (d) future changes for promoting student involvement in IP generation; and (e) best practices. Most faculty members indicated that unclear policies, a lack of information, and questions around ownership of inventions were the most significant obstacles when guiding and teaching students. This research contributes to best practices for undergraduate IP generation to minimize challenges for faculty, students, and academic institutions.

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Engineering and entrepreneurship educators are paying more attention to the generation of intellectual property (IP) by students as involvement in the invention and innovation increases. Universities are investing in educational and experiential programs designed to equip students with entrepreneurial skills projects to prepare them for the contemporary job market. Also, entrepreneurial opportunities are more accessible given the lower startups costs associated with software and apps, which allow more undergraduate to participate in entrepreneurship early in their college experiences (Pilz, 2012). These result from entrepreneurship courses or competitions where students create projects on their own or in partnership with industry through capstone and design courses (Alexander, Beyerlein, & Metlen, 2014).

While more attention is being paid to the development of IP in some classes, it is unclear how widespread undergraduate and faculty involvement is and/or what issues they face. We also know fairly little about how intellectual property policies and practices are actually applied to undergraduate students (Nordheden & Hoeflich, 1999). Therefore, we do not know how much emphasis to place on it as a potential learning objective, or the specific issues and concerns that faculty have, which could be addressed through policies and practices. The purpose of this study is to examine some of the issues, and to understand what should be emphasized in the classroom, given the growing likelihood that students will create and develop the intellectual property.

LITERATURE REVIEW

The common scenarios in which undergraduate students are involved in generating intellectual property include: (1) entrepreneurship education programs and experiential learning activities; (2) industry-sponsored engineering or product design courses; (3) university-sponsored product design courses; and (4) undergraduate research projects (Duval-Couetil,

Pilcher, Weilerstein, & Gotch, 2014). Each context poses unique issues that can result in disputes among university administrators, faculty, and undergraduate students themselves due a lack of explicit agreements, resulting in disputes about IP contributions and ownership.

Unlike faculty and graduate students who are employed and paid by the university, the IP rights of undergraduates are complex since they pay to participate in educational programs and, to some extent, take advantage of institutional resources. This very different arrangement or transaction requires IP policies and practices that differ from those directed at paid employees of the university. Nordheden and Hoeflich (1999) described the reasons why students might run into issues with intellectual property. First, it is not customary for undergraduates to be asked to sign agreements allocating intellectual property rights prior to beginning student research. Second, in many cases, the intellectual property generated by undergraduate students is the result of involvement in projects or research in which they participated for academic credit, meaning that traditional IP laws and regulations cannot be applied. Third, it is often difficult to clearly delineate which IP contributions can be attributed to undergraduates when they are the result of laboratory or collaborative work. These situations can be even more complicated in fields such as computer science, where even young researchers can make significant contributions worth protecting as intellectual property.

While many academics turn to Technology Transfer Office professionals for guidance concerning intellectual property policy, undergraduate students tend to approach faculty members for advice concerning their research and ideas and see them as critical resources for understanding institutional policy and navigating intellectual property regulations (Duval-Couetil et al., 2014). Informal survey data collected at an entrepreneurship and engineering education conference indicated that faculty members do not feel prepared to counsel students regarding

these issues (Duval-Couetil et al., 2014). Faculty indicated having a lack of personal knowledge about what legal agreements are necessary. They indicated that students' understanding of university IP policies was inadequate. The also expressed difficulties associated with fairly balancing the interests of students, industry sponsors, and institutions. It was also clear that a faculty member's familiarity with (and attitude towards) their own institution's Technology Transfer Office could influence students' understanding of policies. Therefore, if faculty lack substantive knowledge of the university's IP policies, then the undergraduates who turn to them for guidance may further complicate issues by acting on misinterpreted policies.

The purpose of this exploratory research was to examine the nature of faculty interaction with undergraduate students about IP, as well as issues related to policies and practices, as part of an effort to be more proactive in educating faculty and students to be prepared for possible outcomes. The research questions are as follows:

1) What is the extent and nature of faculty involvement in IP generation by undergraduate students?
2) What are the challenges that faculty are confronting related to the undergraduate generation of IP? How does it differ by faculty?
3) What are the indicators of success in supporting undergraduate IP generation?
4) What initiatives would make it easier to manage student-generated IP?

METHODS

Sampling

The sample was comprised of 143 faculty members involved in entrepreneurship education at universities across the United States. We used two methods to recruit survey participants. First, a non-profit foundation that is actively involved in promoting technology

entrepreneurship distributed the survey to their members. Second, we contacted faculty members in the departments of engineering and entrepreneurship at seven research universities in the U.S. In all, 1,876 faculty members were invited to participate in the survey. Each received a link to an online survey via email, and their participation was completely voluntary. A total of 143 faculty members completed the survey. Of these, 98 (68.5%) were tenure track faculty, 27 (18.9%) were non-tenure track faculty, 29 (20.2%) were university administrators, 12 (8.4%) were entrepreneurs, and 3 (2.1%) were industry representatives. Their affiliation was mostly in colleges of engineering (n = 103, 72.0%) and entrepreneurship education departments (n = 31, 21.7%). Most were from research universities (n = 103, 72.0%) rather than teaching universities. The demographic information of our sample is presented in Table 1.

Table 1. Demographic Information of Participants

Variable	*n*	Percentage
Gender		
Male	104	71.7
Female	20	13.8
Do not wish to respond or missing	21	14.5
Role (Multiple Response)		
Tenure track- Full professor	63	43.4
Tenure track- Associate professor	17	11.7
Tenure track- Assistant professor	18	12.4
Non-tenure track faculty	27	18.6
University Administrator	29	20.0
Industry representative	3	2.1
Entrepreneur	12	8.3
Other	7	4.8
Department (Multiple Response)		
Engineering	103	71.0
Mechanical engineering	25	(17.2)
Biomedical engineering	21	(14.5)
Electrical engineering	10	(6.9)
Chemical engineering	6	(4.1)
Bioengineering	4	(2.8)
Other	25	(17.2)
Entrepreneurship in business school	18	12.4
Entrepreneurship in multidisciplinary program	13	9.0
Other	26	17.9
University Type		
Public	97	66.9
Private	32	22.1
Do not wish to respond or missing	16	11.0
University Region		
Midwest	54	37.2
Northeast	33	22.8
South	21	14.5
West	16	11.0
Other	4	2.8
Do not wish to respond or missing	17	11.7
University Size		
Small (under 3,000)	7	4.8
Medium (3,000 to 10,000)	14	9.7
Large (more than 10,000)	110	75.9
Do not wish to respond or missing	14	9.7
University Classification		
Research University	103	71.1
Teaching University	13	9.0
Undecided	17	11.8

Survey Instrument

We developed a survey instrument that grouped items into categories that aligned with the research questions: 1) the extent and nature of faculty involvement in undergraduate IP; 2) issues confronting faculty as they relate to undergraduate IP; 3) the indicators of success in undergraduate IP education; 4) future changes for promoting student involvement in IP generation; 5) best practices, and 6) participant demographics. The original items were written based on a review of the literature. Three experts reviewed the survey regarding the relevance of contents and the structure. The final survey included 63 items using a 5-point Likert response scale and open-ended questions and was administered through the Qualtrics survey software.

Analysis

Given the exploratory nature of this study, we used descriptive analysis to summarize quantitative response data. We compared the views of faculty members who have guided students through the patent process and those who had not using t-tests. Open-ended questions were qualitatively analyzed to extract common themes in the responses.

RESULTS

What is the extent of faculty involvement in IP generation by undergraduate students?

First, it was essential to understand the degree to which undergraduate IP was even an issue for faculty members, and why they may have been interested in answering the survey. Most respondents (80.7%) reported that they had a general interest in the topic. Sixty percent of the participants were interested in the undergraduate IP issues because of the institutional challenges. Over a half were interested because they taught courses that involved the generation of IP (55.9%). The most common activities or contexts for faculty encountering IP issues were in

senior design or capstone courses (97.5%), undergraduate research activities (64.2%), and entrepreneurship courses (55.9%).

Table 2. Participants' motivation (why they are interested in undergraduate IP generation)

Items	Frequency (%)	
	Yes	No
General interest in undergraduate IP generation	117 (80.7)	11 (7.6)
Courses that I teach relate to undergraduate IP generation	81 (55.9)	43 (29.7)
Institutional challenges related to undergraduate IP generation	87 (60.0)	32 (22.1)
Institution is examining how to manage undergraduate IP generation	80 (55.2)	41 (28.3)

To understand how big an issue this was for respondents, they were asked about the frequency of their direct involvement in undergraduate IP generation. Fifty-three percent of the participants reported they had students involved in patent activities, with an average of 4.63 students involved during the previous year and an average of 22.66 students over the past five years. However, the variation was quite large (SD_{1year} = 33.61; SD_{5year} = 168.56). From other descriptive statistics (Table 3), it was notable that most participants reported that they had no student involvement in their patent activities over the past year ($Mode_{1year}$ = 0, $Median_{1year}$ = 0) and none over the past five years ($Mode_{5year}$ = 10, $Median_{5year}$ = 6). Among participants who had involved students in patent activities, most participants reported that 1-5 students had been involved over the past five years.

Table 3. Number of students involved in activities that the participants patented inventions

over the past one year		over the past five year	
# of students	Frequency (%)	# of students	Frequency (%)
none	92 (63.0)	none	81 (55.9)
1~5	46 (31.5)	1~5	30 (20.7)
6~10	2 (1.3)	6~10	15 (10.3)
11~15	1 (0.7)	11~15	6 (4.1)
16~30	1 (0.7)	16~30	6 (4.1)
more than 30	4 (2.7)	more than 30	7 (4.8)
Mean	4.63	Mean	22.66
SD	33.61	SD	168.56
Mode	0	Mode	0
Median	0	Median	0

What are the issues or challenges that faculty are confronting related to undergraduate generation of IP?

Participants were asked to rate the extent to which they agreed IP specific undergraduate IP challenges were an issue. These challenges were organized into six categories: unclear policies, unclear ownership of invention, general lack of information, teaching/guiding students, attitudes, and resources. Of these, respondents most strongly agreed that items in the *unclear policy* posed the greatest challenge (Table 4). Approximately 40% of participants (n = 59) strongly agreed that applying university IP policy to undergraduate IP was challenging (M = 3.88, SD = 1.24). Most respondents perceived that a lack of university policy (M = 3.31, SD = 1.29) and difficulties interpreting IP policy (M = 3.69, SD = 1.09) were also significant challenges. A synthesis of open-ended responses provided by eight respondents reinforced that unspecified and/or undefined policies regarding undergraduate students hampered their IP creation and protection. Policies were considered by these respondents to be too broad or abstract, often allowing universities to claim students' IP even when their authority to do so was not certain. One participant stated:

> *"We have an unwritten policy, undergraduate students own their IP. We will provide guidance and assistance in helping them to protect their IP, but since this is an unwritten policy, it raises concerns each time."*

Some participants acknowledged that IP policies at their institutions only applied to students who received some form of funding from the university, and students who did not received funds from the university were not acknowledged in the policies.

> *"Policies only cover individuals that are supported by university, thus undergraduates fall through the cracks of the policy for the most part."*

A lack of information was the second greatest obstacle cited by participants. Responses indicated that a lack of student understanding about best practices and policies can be a serious issue for undergraduates ($M = 3.71$, $SD = 1.05$). One participant expressed concern that the information given to students about IP was biased toward the best interests of the university rather than the student:

> *"All the information given to students is BIASED toward the universities best interest. There is very little to no best practice knowledge out there being supplied to students about how to not have to deal with IP licensing offices which will slow down their commercialization and or cost them dearly as they launch their business and license."*

Respondents also noted that lack of standard policies ($M = 3.61$, $SD = 1.14$) and inadequate information ($M = 3.58$, $SD = 1.06$) were problematic obstacles inhibiting undergraduate student IP generation.

Unclear ownership of inventions and *lack of resources* were ranked as third and fourth respectively among the six categories. Regarding *unclear ownership*, participants were expressed concern with a number of scenarios, including: when faculty partially contribute to an undergraduate's IP creation; when students receive faculty mentoring that resulted in the

generation IP; when students use university facilities to generate IP; when students invent something prior to being on campus or enrolled in a course; and when students were involved in creating IP as part of a senior design course that also had industry participation. Though participants generally agreed that IP ownership was a problem, perceptions differed considerably by respondent and institutions. For example, participants noted that:

> *"It is pretty clear that when government or industry funds are involved that the university owns it. However, when taken for course credit typically government and/or industry funds are not used and the university still asserts rights in these situations if it is in their best interest."*
>
> *"Industry participation in senior design is problematic and without clear policy. Current policy is very restrictive and does not encourage industry participation."*
>
> *"We are able to apply our policies to situations internal to the university. Managing industry expectations around capstone projects and undergraduate research is much more challenging, and I don't believe we manage this consistently yet."*

Some participants also reported some negative experiences they had when collaborating with or advising undergraduate student on inventions. For example:

> *"Undergraduates think the whole university is put here for them to use for their pleasure. While faculty have minimal say over IP issues in contracting, consulting, faculty-owned businesses, etc., people want to throw state resources at undergraduates to exploit the same facilities and resources that faculty are prohibited from exploiting for their gain."*
>
> *"Faculty involvement, which is usually ad hoc, goes unrecognized and, in most cases, the ideas that overcome the critical issues (i.e., the novelty of the IP) which is the actual patentable invention goes to the students with no credit to the faculty "advisor". This happened to myself, in point of fact. Thus, I no longer involve myself with such competitions as I am not in the business of giving away my IP for free."*

In terms of the lack of resources, participants agreed that the lack of funding for IP protection ($M = 3.62$, $SD = 1.04$), lack of legal assistance ($M = 3.57$, $SD = 1.00$), and lack of technology transfer professionals ($M = 3.48$, $SD = 1.03$) were significant issues. Multiple participants pointed out that the quality of TTO services tend to differ by institution, and most

are not appropriately prepared to address undergraduate student IP issues. One participant elaborated, saying:

> *"At my institution, the TTO is not interested in assisting with IP generation, they are interested in taking advantage of unsuspecting faculty and students for their own benefit."*

Other participants mentioned that a lack of university funding dedicated to student IP protection was problematic:

> *"The University only has limited amount of funds for IP protection and rarely have they invested those funds in student IP, but still make a claim on student IP. Does not make sense."*

Some participants pointed out that the university (or even the faculty members themselves) did not consider undergraduate students to be invested. They explained that:

> *"The university I work for does not trust undergraduates to generate IP that is worth something."*

> *"Huge lack of funding to support development of IP by full-time faculty! Start with the experts, don't start funding undergrads!"*

However, attitudes towards commercialization in general, and the teaching/guiding of students in relation to IP policies specifically, were not regarded by participants as serious issues. Participants mostly disagreed with statements concerning things such as a lack of motivation to protect students' IP ($M = 2.60$, $SD = 0.96$) and unwillingness of students to share their ideas ($M = 2.61$, $SD = 0.97$).

Comparisons between participants who have guided students through the patent process and those who have not, revealed differences in perceptions of the challenges involved. Faculty who had helped students with patents reported greater concern for teaching students the value of protecting intellectual property than those who did not ($t = 2.48$, $p < .05$; $t = 2.14$, $p < .05$). These faculty also perceived greater unwillingness of students to share their ideas as a challenge to encouraging undergraduate IP generation ($t = 2.43$, $p < .05$). However, faculty who had not

previously guided student through patents, perceived unclear ownership as being most serious where industry projects were involved (t = -2.07, p < .05).

Table 4. Challenges Related to Undergraduate Generation of IP

	Faculty who have guided student patent (n = 76)		No experience (n = 63)		t	Total (n =143)	
	M	*SD*	*M*	*SD*		*M*	*SD*
Unclear Policy (Rank=1)							
Lack of a university IP policy	3.19	1.35	3.44	1.25	-1.11	3.31	1.29
Interpreting IP policy	3.70	1.06	3.64	1.14	0.31	3.69	1.09
Applying IP policy	3.84	1.32	3.93	1.17	-0.45	3.88	1.24
Unclear Ownership of Invention (Rank=3)							
When industry projects are involved	3.55	1.11	3.92	1.01	-2.07*	3.73	1.07
Undergraduate involvement in research	3.19	1.00	3.43	1.01	-1.39	3.29	1.00
When faculty is co-inventor	3.42	1.15	3.60	1.12	-0.91	3.49	1.13
Lack of Information (Rank=2)							
Inadequate information	3.69	1.08	3.46	1.05	1.25	3.58	1.06
Lack of information about best practices	3.74	1.09	3.67	1.02	0.39	3.71	1.05
Lack of standard policies	3.64	1.20	3.57	1.09	0.32	3.61	1.14
Teaching/Guiding Students (Rank=6)							
Teaching students the principles of IP	3.47	1.13	3.00	1.05	2.48*	3.24	1.12
Teaching students the value of IP	3.52	1.18	3.10	1.13	2.14*	3.29	1.18
Lack of information of counseling students	3.51	1.01	3.35	0.97	0.97	3.44	1.00
Lack of comfort in counseling students	3.09	1.19	3.11	0.97	-0.10	3.11	1.09
Attitudes (Rank=5)							
Lack of motivation of protecting students' IP	2.54	0.99	2.67	0.95	-0.77	2.60	0.96
Faculty mistrust of the TTO/Univ intentions	3.49	1.20	3.41	1.17	0.40	3.46	1.17
Student mistrust of the TTO/Univ intentions	3.36	1.05	3.05	0.94	1.83	3.22	1.00
Unwillingness of students to share their ideas	2.76	1.08	2.38	0.77	2.43*	2.61	0.97
Resources (Rank=4)							
Lack of funding for protection of IP	3.78	1.04	3.44	1.04	1.87	3.62	1.04
Lack of facilities and resources	3.30	1.29	3.13	1.09	0.86	3.23	1.19
Lack of legal assistance	3.62	1.06	3.51	0.97	0.64	3.57	1.00
Lack of technology transfer professionals	3.62	1.05	3.32	1.00	1.73	3.48	1.03

** p < .05*

Indicators of Success and Best Practices

Participants were asked to rank the indicators of success for supporting undergraduate IP according to the level of priority placed on them by their institution, with the most important indicator rated '1' and the least important rated as '6'. Increasing student involvement in real

world innovation and invention was rated most highly by faculty indicating what they perceived was valued most highly by their institutions. Changing students' mindset, and number of patents filed by students, was reported by participants as relatively less important indicators at their institution.

There were a few negative opinions raised by participants during the study. Three participants pointed out that their institution did not place any importance on any of the indicators. For example, one participant commented:

> *"The intellectual property office does not appear to have any real goals. The purpose of the office and how its success is measured is unknown to nearly all faculty and students."*

Another participant suggested that the priority given to undergraduate IP support and IP policy education could depend on the program of study and may not be representative of attitudes and practices of the university as whole. Finally, one participant made a noteworthy comment about the notion of IP support for undergraduates by educational institutions being ill founded, stating that:

> *"Universities are teaching institutions and should not usurp the responsibilities of the state in business development initiates of the population."*

Table 5. Indicators of Success in Educating/Supporting Undergraduate IP Development

Indicator	Frequency (N = 123)						M (SD)	*Rank*
	1	2	3	4	5	6		
Increasing student involvement in real world innovation and invention	48	34	29	10	1	1	2.08 (1.08)	1
Enhancing student involvement in entrepreneurship	19	21	24	32	21	48	3.26 (1.45)	2
Enhancing student involvement with industry	17	24	21	30	20	11	3.35 (1.53)	3
Increasing student knowledge and understanding of IP	11	22	26	29	29	6	3.50 (1.39)	4
Changing students' mindset	19	15	11	9	21	48	4.12 (1.93)	5
Increasing number of patents filed by students	9	7	12	13	31	51	4.68 (1.58)	6

Note. The number (e.g., 1, 2, 3, 4, 5, 6) indicates rank number. Mean is calculated with the rank number. Lower number indicates higher agreement among participants.

Future Changes

On the topic of future changes for promoting student involvement in IP generation, participants were asked to suggest how to mitigate the issues and challenges related to supporting undergraduate IP development and student intellectual property protection. Eighty-eight participants responded and six themes were extracted from their comments. These themes included: clearly written policy; university taking no claim on student IP; early education and training about intellectual property issues; consulting assistance from TTO; creation of entrepreneurial culture or ecosystem; and legal system with low cost. A more in-depth analysis of the three primary themes is noted in the sections that follow.

Changes in policy. The most frequently mentioned theme was setting a clearly written policy (n = 17). Participants recognized the need for explicit, firmly worded policy:

> *"Simply to have clear policies which are interpreted consistently and a greater effort to educate students and other affected parties about them."*

> *"A clear policy on student ownership and a rigorous test if the university is to be able to claim any IP."*

Clear ownership was also a significant concern for faculty involved in student IP generation. Fourteen participants suggested that the university should not have any claim on student IP and simply let undergraduates wholly retain the rights to their IP. These faculty members viewed current university practices as infringing on undergraduate's rights and discouraged undergraduates from developing their IP further as students:

> *"In my opinion, the university should have a hands-off policy with regard to student generated IP."*

> *"The University should have no claim on student IP unless there is an employee of the university employed to research and invent. They have already paid for access to support services through tuition and fees as well as taxpayer support."*
>
> *"Universities must give complete ownership of IP to the students who develop it except in case of significant use of university resources."*

Early education and training about intellectual property policy (n = 6), consulting assistance from TTO (n = 5), creation of entrepreneurial culture or ecosystem (n = 3), and legal services with low cost (n =2) were also mentioned as possible solutions for circumventing or mitigating undergraduate IP issues.

Useful standard agreements. Regarding IP agreements, thirty-nine participants responded there were existing standard IP agreements that would be useful in this area. Of these responses, 9 participants elaborated by saying that specifically outlining when students legitimately own IP would be helpful. In particular, they pointed out the necessity of having clear standard IP agreements among faculty, university and students in entrepreneurship classes and senior design classes. Three participants mentioned the possibility of using existing standard agreements formats like NDA and CDA. Four participants recommended the standard IP agreements used at Pennsylvania State University, University of Texas at A&M, Massachusetts Institute of Technology, and Georgia Institute of Technology as examples of best practices that might be adopted by other institutions.

Educational resources to manage the issue. Forty-four participants responded to questions about what educational resources should be used to inform students about intellectual property. The format and content of the suggestions provided by the participants varied. In regard to resource formats, books/workbooks, websites, seminars, short courses, videos, case studies, and mentoring services were mentioned. In regard to content, best practices (n = 7) and the process of how to receive patents (n = 3) were the most frequently mentioned.

Entrepreneurship classes (n = 3) and talking with successful entrepreneurs (*n* = 2) were suggested as resources as well. Using related materials from law schools and sample agreement forms were also suggested.

CONCLUSION

The purpose of this study was to gather and synthesize faculty views regarding the challenges, catalysts, and future directions for promoting undergraduate intellectual property on campus. Findings indicate that faculty who are involved in undergraduate IP generation perceived unclear policies, lack of information, and unclear ownership of inventions to be the most significant obstacles when guiding and teaching students about intellectual property. The most serious issue was focused on the process of applying the unclear policy. As the literature mentions (Nordheden & Hoeflich, 1999), faculty members recognize that at many universities, existing intellectual property policies do not specifically pertain to undergraduate students and are applied as rules of thumb.

Faculty reported that unwritten policy can often lead to unfavorable situations for undergraduate students. From the open-ended participant responses, a number of faculty members were concerned that unfair IP policies biased ownership toward universities. Conversely, some faculty members complained that the rights of faculty collaborators are easily ignored, especially in capstone classes or projects without standard IP agreements. Further, undergraduate students who do not receive funding from the university, or who do not sign IP agreements, are placed in a gray area where legal practices do not work for everyone involved.

From the results of the study, the question remains: what do faculty members expect to see from the university? Rather than providing resources and facilities, participants reported that educating undergraduate students about intellectual property protection and entrepreneurship is their most important thing these institutions can do to improve undergraduate IP generation

process. Regarding university resources that should be offered to student inventors, mentoring from faculty or experts outside of university was recognized as the most important resource, especially by faculty members who have guided undergraduate students through the patent process in the past. This implies that university faculty believe that effectively educating students can mitigate or even avoid potential problems related to student intellectual property.

Faculty members also reported the lack of legal assistance and lack of technology transfer professionals to facilitate the intellectual property issues of undergraduate students. They seemed to recognize the uncertain role of the TTO when it comes to assisting undergraduates. For most of the participants, TTO was perceived as traditionally assisting funding projects for faculty and universities; however, changing needs suggest that the TTO and universities should expand their roles to include assisting undergraduate students.

In summary, faculty members who had experience with guiding students through the patent process held differing views than those who did not. While the views of these faculty members had significantly stronger views on where problems occurred and what resources should be provided, it is evident that there is still much to be accomplished on clarifying and solidifying meaningful understanding of undergraduate intellectual property rights. With further research and understanding, best practices for undergraduate IP generation can be applied to avoid further IP challenges for faculty, students, and academic institutions.

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