Journal paper requirement for PhD graduation

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Abstract - Department chairpersons in Mechanical Engineering departments in the USA as well as a few chairpersons worldwide were polled regarding their institutional requirements for doctoral graduation in the form of peer-reviewed publications. The data as well as perceived advantages and hurdles to implementation of various options are discussed. A proposal is made for implementing such a requirement.

Keywords – Doctoral studies, PhD graduation, Mechanical Engineering, publication requirements

Requerimientos de Publicaciones en Revistas para Graduación Doctoral

Resumen – Se envió un cuestionario a directores de Departamentos de Ingeniería Mecánica en los Estados Unidos, como así también a algunos directores en otros países del mundo, acerca de los requerimientos de sus instituciones para graduación de estudiantes doctorales en la forma de publicaciones con revisión por pares. Se discuten los datos, así como las ventajas y problemas percibidos en la implementación de varias opciones. Se efectúa una propuesta para la implementación de esos requisitos.

Palabras clave – Estudios doctorales, Graduación de doctores, Ingeniería Mecánica, Requisitos de publicación

INTRODUCTION

Publication in peer reviewed, archival media is one of the indicators of quality and productivity widely accepted for academic endeavors. It is used routinely by American research universities as one of the evaluation criteria for faculty. It is also of preponderant importance in evaluating applicants for open faculty positions in the USA. With the primary objective of better preparing our Ph.D. graduates for securing faculty positions in academia, the department encourages publication of doctorial dissertation research in peer reviewed, recognized, archival publications. The faculty recognizes that preparing our graduates in this particular aspect provides an opportunity to impart valuable knowledge, skills, and experience that transcend the value of the publication itself.

A number of issues may get in the way of manuscript preparation during the doctoral residency, sometimes leaving the manuscript preparation to the advisor after the student has departed. This circumstance robs the student of the benefits of the experience that preparing the manuscript affords. Therefore, an attempt is being made to make manuscript preparation a requirement for graduation. Recognizing some of the hurdles that a strict requirement may impose, we sought information from most department chairpersons in Mechanical Engineering departments in the USA. The data collected as well as issues that became evident during the process are discussed in this article.

POLL QUESTIONS AND RESULTS

We asked more than 350 Chairpersons of Mechanical Engineering Departments, most of them in North America, the following question: "I'd like to know if your program has (or not) any requirements regarding any number of journal papers that must be accepted as a "requisite" for the completion of a Ph.D. degree in your department?"

We received 70 responses [0]. Of those,

- 12 programs "require" 1 or 2 papers for graduation.
- 52 programs "strongly encourage," but do not require it.
- 6 programs responded that do not have a Ph.D. program.

Virtually all of the "strongly encourage" institutions said they "strongly expect" doctoral students to publish, but cited implementation problems that prevented them from imposing their expectation as a requirement, mainly due to the possibility of graduation being delayed because of a slow paper review. At WVU, we are looking into options to overcome such hurdles. The 12 institutions that "require" accepted peer-reviewed manuscript are invariably among those aggressively seeking higher recognition among their peers as evidenced by other indicators besides the publishing requirement.

In retrospect, we should have asked also, "How many students have at least a paper resulting from their doctoral work eventually accepted?" but we doubt anyone has such

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data available. To address this shortcoming, we researched our own graduates during the five year period 2002-2007. We counted the number of peer-reviewed publications of our graduates, including all the publications to date. We circulated the compiled list among the advisors of those students and among recent graduates to correct the list for omissions and to include papers accepted but not yet published. Here are the results. For the five year period 2002-2007 our program had 41 Ph.D. graduates. Twenty-eight of those graduates (68%) published a total of 64 peer-reviewed manuscripts (about 2.3 papers per graduate). The remaining 32% of graduates did not publish. Lack of systematic training and a formal requirement for publication could be some of the causes for almost a third of Ph.D. graduates not publishing their Dissertation work in peer-reviewed archival publications.

BENEFITS

Unquestionably, doctoral candidates should receive training and mentoring in the process of developing, preparing, submitting, reviewing and securing publication of their work in peer-reviewed media. Practical experience in publishing their own work is perhaps the most motivating of all forms of training that could be imparted at the doctoral level. The research advisor is in a privileged position to guide the student through this self-learning process because the advisor has first hand experience publishing in the particular field of research and has a working relationship with the student that facilitates learning.

The process of preparing, submitting, and revising a manuscript may bring about other desirable outcomes if implemented properly. For example, it provides the student and the examining committee, including the advisor, with two or three blind opinions about the research being undertaken without investing the blind reviewers with authority over the advising and examining process. Note that in Engineering at WVU, the advisor is part of the examining committee and that such committee is formed early on during the student residency, so that all members are available for consultation during the entire period of study. Then, the examining committee can use blind reviews as they see fit to advise the student regarding the course of the research. In order to take advantage of this feedback mechanism, at least one manuscript must be submitted with enough anticipation to allow the examining committee to provide feedback before the research is virtually completed. Ideally, comments from blind reviews should be available by the time of the proposal defense. If the proposal defense is viewed as a formal step in the doctoral program process and its scheduling takes place after the student has generated sufficient preliminary data, then a manuscript can be submitted prior to the proposal defense. In this way, the student gains publication experience early, and both the student and the examining committee have available preliminary data and peer-review of it, at the time of proposal defense. Such scheduling of events would most likely enhance the student's program of study.

Unquestionably, peer-reviewed publications accepted or published at the time of graduation greatly enhance the student's resume and prospects for securing post-doctoral, faculty, government, or industry positions.

In addition, increased journal publication by students is a mechanism whereby the quality of doctoral education is improved. This improvement in the quality of doctoral education will lead to increasing competitiveness of universities taking steps to train doctoral candidates in manuscript preparation and consequently will lead to increasing number of companies hiring graduates with those skills.

It is also worthwhile to mention that, in contrast to almost exclusive review of doctoral candidates' research by their advisors, indirect peer review opens up a peer dialogue among faculty in the examining committee and at other institutions, albeit moderated by the editorial process. This dialogue provides an opportunity for collegial discussion, thus increasing overall quality of research programs.

Finally, more Ph.D. graduates are likely to pursue academic positions if they have strong publication records and have benefited from the stimulus of preparing papers. This is critical in light of the significant number of retirements anticipated for the next few years in government and academia in the USA.

HURDLES

Most respondents to the survey cited implementation problems, as follows.

Some expressed reluctance to yield control over graduation to an external agent, namely the editor of a publication and or the reviewers supporting the decision. Such concern can be addressed by allowing the student to submit an alternate manuscript in case the first one is irreparably rejected.

Some expressed concern that graduation could be delayed due to delayed acceptance. Such concern can be allayed by starting the process early. We are proposing to start the process nearly four months before the proposal defense. This would allow plenty of time to address the blind review comments.

Of course, starting the process early may create another problem, namely that the proposal defense would be delayed until sufficient material is available for preparation of a manuscript. However, some are of the opinion that this is a good development, as it seems inappropriate to have a proposal defense without enough preliminary data. Furthermore, delaying the proposal defense happens anyway; we have never been successful at enforcing deadlines for defending the proposal, and it may not be such a bad thing if progress towards a manuscript is being made.

Yet others expressed reservations for cases when the research is restricted to protect intellectual property, or due to export control restrictions [0]. Provisions should be made to allow students engaged in such activities to graduate without public disclosure of their work in these cases. Furthermore, many consider a valuable skill to learn how to publish non-confidential research results obtained as part of confidential projects. Faculty and students need to learn how to do this.

PROPOSED MODEL

The Department of Mechanical and Aerospace Engineering at West Virginia University is considering implementation of the following model. All doctoral candidates having completed the qualifying exam would be required to prepare, submit, and obtain reviews on at least one manuscript before their proposal defense. The reviews will be made available to the examining committee before the hearing of the proposal defense. In addition to their established duties, the committee will provide advice to the student on how to address the blind review comments in order to secure publication of said manuscript or alternate ones if required. Students would be required to have at least one manuscript accepted for publication in a peer-reviewed publication by graduation.

CONCLUSION

Implementation of a requirement for publication is not easy but it is worthwhile. The anticipated implementation hurdles can be overcome by judicious planning and a flexible policy that can accommodate special cases. Such proposal is broadly supported by the faculty as tangible quality improvement for educational programs leading to terminal degrees.

REFERENCES

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