A Sample of Best Practices to Support Veterans in Attending and Completing Engineering Degree Programs

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Abstract

This paper describes some sample best practices identified by three institutions, Virginia Tech, Kansas State University, and the University of San Diego to support the recruitment, transition, and retention of veterans in engineering degree programs. These three institutions represent a subset of the initial cadre of institutions receiving planning grants from the National Science Foundation to facilitate and support veterans in their pursuit of undergraduate and graduate engineering degrees, particularly when utilizing their "GI Bill" benefits. Best practices presented here include a website to co-locate veterans' campus resources virtually, a slide show "video" to highlight the mechanics of graduate school and finding the right program, models to help institutions give military veterans academic credit for military training, results of a regional institutional networking workshop on veterans issues, and strategies to better attract and recruit veterans to engineering degree programs.

Keywords: Veterans; engineering; engineering degree programs; GI Bill benefits

The introduction of the Post-9/11 Veterans Educational Assistance Act of 2008 (the "21st Century GI Bill") creates a synergy between national interests and providing opportunities for those who served. To support this synergy, the National Science Foundation (NSF) created an opportunity where they provided planning grants for some institutions to better facilitate veterans' pursuit of engineering degrees. This paper covers a sample of best practices from three institutions involved in this initiative. These three universities periodically met at meetings and conferences to network and share ideas. This paper represents a sample of best practices from each of these institutions.

One of the practices identified was based on a research study conducted by the authors at Virginia Tech that determined that navigating a college or university can be overwhelming for veterans who are typically older non-traditional students with both unique experiences and unique benefits. The authors located at Virginia Tech recognized that creating university-level resources that "co-located" existing and developing resources for veterans in various institutional offices was critical for attracting, integrating, and retaining veterans in engineering degree programs. At the start of the project, and without a clear stream of funding for a campus veterans support office in place at the time, the authors recognized the opportunity to develop a virtual "one-stop shopping" website to provide links to institutional offices, including contact information in most offices for specific personnel who are aware of veterans issues, as well as links to on- and off-campus organizations and resources, including a virtual home for the Virginia Tech Chapter of the Student Veterans of America.[1] The authors found that many institutional offices were creating resources for veterans, so that creating a central location for advertising resources leveraged individual efforts to create a unified support resource for veterans. While there is now institutional support for a physical office and support personnel for veterans, the website continues to be a central location for information including regularly updated news and events for veterans.

Virginia Tech also recognized that many veterans (and other students) may not be aware of the structure and expectations of graduate-level study and so the authors developed a voice-over slide show, *Graduate School 101: What to Expect When You are Considering a Graduate Degree*, to help demystify graduate programs.[2] The slide show goal is to help demystify graduate school and provide solid tips for finding the right graduate program and advisor as well as application preparation advice. While some information is specific to veterans, the presentation content is useful to any student considering a graduate degree.

The authors at Kansas State University focused on the fact that a major road block to degree completion by military veterans is the issue of getting academic credit for military training and experience. To deal with this in a timely manner requires a thorough evaluation of the veterans' training, experiences, and expertise with the option of granting academic credit where appropriate. Current policies at many universities give little credit for military experience or training. One issue with the use of military credit is that most of the academic credit is ungraded. A possible avenue to overcome these rules is the use of advanced placement exams (where they exist) and university-generated quiz-out exams. Other resources such as the American Council on Education (ACE 2009) directory and university credits for community college work also provide a resource to determine class equivalency.

With a focus on undergraduate engineering, the program at Kansas State University also includes development of on-line pre-assessments and linked subject-based tutorials to accelerate the veteran's entry into the traditional math sequence beginning with Calculus I or higher. The same concept of

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[1] See *Veterans at Virginia Tech*. Virginia Polytechnic Insitute and State University. 2013. Web. <www.veterans.vt.edu>.

[2] "Graduate School 101: What to Expect When You are Considering a Graduate Degree." *YouTube*. Posted by Ennis McCrery. 20 July 2013. Web. <http://youtu.be/GPOQj41rCUI>. Also located on the *Veterans at Virginia Tech* website.

online pre-assessment and tutorials followed by a proctored final assessment is also being developed for entry-level engineering courses. As in mathematics, veterans would complete an on-line pre-test with linked subject based tutorials ahead of enrolling in the program. The veteran would have the option of completing a one-time proctored post-test for course credit (C or better). This approach leverages the veterans' existing technical knowledge acquired through the technical nature of their service posts and accelerates their entry to follow-on technical courses. Additional on-line training at Kansas State University will focus on areas related to common computer application programs such as MatLab, P-Spice, VHDL, and Verilog.

The authors from the University of San Diego recognized that most schools are working independently to identify ways to recruit and retain veteran students, and that the dialogue between schools is usually informal. Consequently, a critical element of the work done at the University of San Diego was to host a regional workshop with the goal of understanding the common challenges schools face in supporting veterans. The *Issues in Educating Veteran Engineers* took place in June 2010 when faculty from 19 schools attended a regional workshop hosted at the University of San Diego. Thirteen specific challenges related to attracting veterans and helping them transition into engineering careers were identified along with more than 50 strategies for meeting these challenges.[3] This workshop shaped some of the University of San Diego's subsequent work, which has emphasized recruitment of veterans. In particular, the University of San Diego has developed a veteran-centric recruiting video and companion brochure, and admissions processes were changed to enhance the identification of active duty military, and the processing of their applications. As a result of these efforts and other engineering and campus-wide initiatives, the number of veterans in engineering at the University of San Diego has increased.

In summary, A sample of selected best practices from three institutions identify how critical issues associated with recruiting, transitioning, and supporting veterans in engineering degree programs can be successfully addressed and often have broad application beyond engineering programs. Virginia Tech focused on the importance of having a central website for campus-wide veterans' resources to help veterans navigate, integrate, and succeed in a college/university campus. Virginia Tech also recognized that many veterans (and other students) may not be aware of the basic structure, expectations, and opportunities associated with graduate-level study and developed an informational voice-over slide show on this topic. Kansas State University recognized the disconnect between military training and academic course credit, and focused on bridging this gap. The focus is on creating resources for veterans including on-line pre-assessment resources and final proctored assessments to help veterans leverage their military training into college course credits. University of San Diego recognized that many schools worked independently to address veterans' issues, and developed a regional conference resulting in a resource report detailing identified issues and suggestions for addressing them. Additionally, the focus has been on the development of recruitment materials for attracting veterans to engineering degree programs, including modifications to their application process to help active-duty military apply.

Reference

American Council on Education (2009). *From Soldier to Student: Easing the Transition of Service Members on Campus.*

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[3] See "Report from Issues in Educating Veteran Engineers." Rick T. Olson, Ed. University of San Diego. 24 June 2010. Web. <*http://catcher.sandiego.edu/items/usdengr/Issues%20in%20Educating%20Veteran%20Engineers%20Workshop%20Summary_final.pdf*>.

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Mary Kasarda is an associate professor in the Department of Mechanical Engineering at Virginia Tech. She has authored over 70 publications in the areas of magnetic bearings, rotating machinery health monitoring, and engineering education. Her contributions in the engineering education area include addressing issues associated with veterans returning to higher education, underrepresented minorities in engineering programs, and facilitating engineering in K-12 settings. She was the Principle Investigator on the NSF-Sponsored planning grant, which funded the development of the VT veterans resources website, Veterans@VT, among other initiatives. She was a member of the development team for the new Engineering Program at all-women Sweet Briar College. She is has been involved with undergraduate education as an ABET Program Evaluator for ASME, a member of the ASME Committee on Engineering Accreditation, and a commissioner on the ABET Engineering Accreditation Commission (EAC).

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