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A Longitudinal Study of Veteran Student Efficacy in the College of Engineering & IT at Georgia Southern - Year 0

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Abstract

Drawing upon recent published studies concerning veteran students and the Post 9/11 GI Bill, the authors extract the top issues military veterans face during their transition into an academic environment and pursuit of higher-level education. Building upon models proposed by Malone (2009) related to military individual training, Lowman (1995) related to student learning and Ambrose (2013) concerning student motivation, the authors adapt an ecological model used by Packard (2016) in her targeted STEM mentoring programs to develop a mentoring program focused on improving the efficacy of veteran students pursuing STEM majors as a means of mitigating those issues and improving graduation rates. The authors describe the longitudinal study of veteran student efficacy they will conduct in the College of Engineering & Information Technology (CEIT) at Georgia Southern University (2016-2020) to assess the effectiveness of the STEM mentoring effort.

Major Issues Faced by Veteran Students

The most significant challenges faced by veteran students in their transition from military to civilian life as well as those experienced in the transition to an academic environment are described in three relatively recent and comprehensive surveys conducted between 2010 and 2015. The most recent study (2015), conducted by the Institute for Veterans & Military Families (IVMF), analyzed survey answers provided by over 4900 respondents (Active Duty, Reserves, National Guard, Veterans and Dependents)[1]. The IVMF survey noted that military service tends to motivate servicemembers to believe furthering their education after transitioning to civilian life is key to their future success. Table 1 lists the top reasons provided along with the corresponding percentage of survey responses.

TABLE 1: Top 5 Motivators of Servicemembers for Pursuing Higher Education	**%**
Career/Job Improvements	86
Self-Improvement	71
Potential for Increased Salary	69
Professional Advancement	56
To Use Earned Benefits	51

Clearly military servicemembers are highly motivated to seek additional education for positive reasons when they transition to civilian life but, in turn, the IVMF Survey also listed the top challenges they face in getting started. Table 2 lists the top barriers along with the corresponding percentage of survey responses.

TABLE 2: Top 5 Barriers to Servicemembers' Pursuit of Higher Education	**%**
Financial Resources	56
Personal/Family Obligations	28
GI Bill Benefits Expired	25
Health/Disability Issues	23
School/Job Conflict	22

Once the former servicemembers actually started their higher educational pursuits, the veteran students described the major challenges impeding their academic progress. Table 3 lists the top problems encountered along with the corresponding percentage of survey responses.

TABLE 3: Top 5 Problems Servicemembers Face Pursuing Higher Education	**%**
Age Differences	37
Financial Resources	32
Working Full Time	32
Family Responsibilities	29
Few Veteran Resources on Campus	26

The Veteran Economic Opportunity Report (2015) contains data collected by the Department of Veterans Affairs (VA) from 2002 to 2013 and offers additional findings related to issues affecting the academic performance and integration of military veterans into academic environments.[2] Of particular note, veteran graduation rates ranged from 40 - 50% with the exception of the Air Force which had a graduation rate of 65%. The findings from a study conducted by RAND (2010) along with the results from the IMVF (2015) survey and the VA report (2015) appear to indicate veteran students begin their transition from military service into academic pursuits well-motivated to succeed but with varying degrees of resilience to the most common challenges faced by students.[3] Educational models of student learning in a STEM environment offer a vehicle for developing a program to mitigate these issues and improve graduation rates by increasing the efficacy of veteran students.

Malone's Training Model (2009)

In 1984, the lead author was part of a small cohort mentored by Colonel (Retired) Dandridge Malone on the key leadership principles contained in his book Small Unit Leadership.[4] In his book, which he had refined during his long career to include combat in Vietnam, Colonel Malone describes an approach junior leaders can use to improve training programs in their small units. This approach is highly focused on individual soldiers and requires situationally dependent assessments of their current level of training (i.e. Skill) and motivation to successfully complete the task at hand (i.e. Will). To improve a soldier's performance, a leader must first understand the task to be accomplished then determine if the soldier has the required prerequisite level of training skill as well as the proper motivation to successfully perform the required activity. The best leaders seek to move all their soldiers into a "High Skill – High Will" training category thus improving organizational performance by increasing every unit member's ability to successfully execute the unit's most critical tasks. Although applications of Malone's Training Model certainly vary by method and level of intensity across the different military branches of service, it is fair to assume that all servicemembers have some positive experience with training related to skill and motivational improvement by the time they leave active duty and enter an academic environment.

Lowman's Learning Influence Model (1995)

In his discussion of exemplary teaching, Lowman (1995) identified three independent sources of influence on student learning: the student, the instructor and the course.[5] The sources were binary in nature. For the student, the influence components were "ability" and "motivation." For the purposes of this paper, the instructor and course sources of influence are captured within the support structure known as "the academic learning environment" within which the student exists. Lowman's variables of "ability and motivation" appear to correlate strongly with Malone's variables of "skill and will" which implies past success in a military environment could translate well into a future academic experience. Lowman's learning influence model presumed a student's ability affected learning more strongly than did his/her motivation but more recent research described by Ambrose et al (2010) suggests a relationship between student efficacy, support provided by the learning environment and the subjective value placed by a student on achieving a desired goal when it comes to motivating that student to learn.

Ambrose's Learning Model (2010)

Ambrose et al (2013) describes the importance of student motivation to learning in terms of the subjective value students place on their academic goal and their expectation that they will be successful in reaching that goal.[6] More specifically, students who seek to attain competence as

they learn do better than those who seek only to avoid doing badly in their studies. Research also suggests that having multiple goals which align with each other is a source of positive motivation for students. The top 5 motivators listed in Table 1 by servicemembers for seeking an academic degree show a range of subjective value. Some have intrinsic value while others have only attainment value. All have instrumental value though which describes the degree to which achieving the goal helps the service member accomplish other goals considered important. Having a mix of intrinsic, attainment and instrumental goals is considered optimal but not sufficient to properly motivate behavior. Ambrose states that students must see a positive linkage between actions and desired outcome. Efficacy factors in here as well since students must also believe that they have the requisite skills and motivation to accomplish goals. Ambrose's model predicts that within the context of a supportive learning environment, well-motivated students with a mix of intrinsic, attainment and instrumental goals perform the best. Packard (2016) presents an ecological model for creating a successful STEM mentoring program to provide just such a supportive learning environment and leverage the skills and motivations servicemembers bring to their transition into academic environments as veteran students.

Packard's STEM-Mentorship Model (2016)

Packard (2016) argues strongly for the use of well-defined STEM student support structures to improve the performance of under-represented minorities in undergraduate STEM education programs.[7] In her literature review, Packard shows that positive mentoring experiences correlate well with improved student persistence and graduation rates. In her work, Packard defines mentoring to include support designed to help students reach important goals and develops the structure of her STEM mentoring effort using an ecological model to depict the interrelated factors that influence the persistence or resilience of STEM students to stay focused and engaged in pursuit of their personal academic goals.

Of particular importance to Packard's STEM mentorship program development are three factors she labels "capacity", "interest" and "belongingness." Capacity refers to a student's ability to learn and demonstrate requisite performance. Mentors can help students improve their personal capacity through various practice opportunities and timely, effective feedback. More importantly, such mentoring can improve a student's self-efficacy of confidence which Packard indicates is often a better predictor of future performance than demonstrated capability. A student's interest in STEM can be expected to wax and wane as they pursue their degree but when maintained and reinforced via mentorship their interest will provide positive support when needed. Mentors can reinforce student interest through practical and professional engagement. Most professional organizations provide affordable access to their activities to students. The sense of belongingness measures the students' belief that they are valued as members of the STEM community. Faculty mentors are most often used but peer mentors typically provide the most powerful tool for making a positive impact on an individual student's sense of belongingness. A mentoring network which integrates faculty, staff and peer mentors can serve to broaden and intensify the feelings of inclusivity.

Packard offered her STEM mentoring program model as a means of improving the graduation rates of under-represented minorities. Given the relatively low numbers of veterans who pursue STEM degrees, her model is attractive and applicable. A mentorship program which initially includes faculty and staff (with or without prior military experience) and is supported by the Dean's staff and faculty will offer a support structure for veteran students that mirrors positive experiences from their prior unit transitions. In successive years, student peer mentors can augment the mentor network to expand its reach and impact.

Longitudinal Study of Veteran Student Efficacy (2016-2020)

Early in their careers, junior military leaders learn that the future success of new members correlates directly to their initial experiences during integration into their new unit. After more than a decade of continuous combat, many of those servicemen and women, now veterans often with several combat deployments, face reintegration issues as they return to civilian life which, for many, includes going back to school to further their education using benefits earned during their military service. Those reintegration issues are often exacerbated by the lack of familiarity with processes and procedures within an academic bureaucracy. A mentorship program which incorporates experiences familiar to veteran students from their time on active duty offers a means to mitigate those issues by improving the efficacy of veteran students.

Since the US Army's invasion of Afghanistan in 2001, the number of veteran students entering with each freshmen class at Georgia Southern University has ranged from a low of 10 to a high of 27 within an average class of 3100 students (0.3 – 0.8%). While not a large population, limiting the study's initial focus to veteran students pursuing STEM degrees allows for the adaptation of Packard's STEM mentorship model to this "underrepresented" student population. Table 4 provides the entrance data for military and veteran students at Georgia Southern University.

TABLE 4: Military Data of First Time Freshman @ Georgia Southern University [Fall - Spring 2000 - 2015]

Year	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	TOTAL
Total Undergrad	13,722	13,817	14,338	14,635	15,185	15,700	15,649	16,157	16,755	17,915	18,488	19,004	19,325	19,350	19,256	**172,361**
Total First Time Freshman	3,285	3,027	3,020	3,185	3,191	3,142	2,618	2,864	2,871	3,252	3,353	3,235	3,196	3,132	3,118	**46,489**
Full Time Military	35	38	49	41	48	49	42	40	42	182	150	166	141	123	117	**1,263**
Full Time Students Veterans	13	17	19	17	19	26	18	10	19	18	14	12	12	13	20	**247**
Part Time Military	6	4	4	3	0	1	0	1	0	3	3	0	4	4	2	**35**
Part Time Student Veterans	3	2	3	2	0	1	0	0	0	2	2	0	1	3	1	**20**
TOTAL MILITARY + VETERANS	**57**	**61**	**75**	**63**	**67**	**77**	**60**	**51**	**61**	**205**	**169**	**178**	**158**	**143**	**140**	**1,565**

With the support of the Dean of the College of Engineering and IT (CEIT) at Georgia Southern University, the authors proposed development of a STEM mentoring effort focused on veteran students pursuing engineering and IT majors within CEIT starting with the Class of 2020 when it enters the university in the Fall 2016 semester. Over the past four academic years, the average size of the freshman class in CEIT has been 715 students. That number is skewed by the large class in 2013 but with the opening of the college's new Manufacturing Engineering degree program designed to service a growing manufacturing industry in the southeast, the size of the freshmen class is expected to stabilize around 700 students. CEIT is the 2nd largest college at Georgia Southern in terms of total students. From two to six veteran students are expected to arrive at CEIT with the Class of 2010 based on historical averages. Data similar to that in Table 4 but limited to the College of Engineering & IT (CEIT) was unavailable from the University's Office of Strategic Research & Analysis at the time of publication but has been requested.

TABLE 6: Freshman Class Size – College of Engineering & IT @ Georgia Southern University (2012-2015)	**# of Students**
AY 2012	710
AY2013	819
AY2014	641
AY2015	689

The primary focus of the longitudinal study (Year 1) will be the development, implementation, assessment and refinement of a focused on-boarding program for veteran students in CEIT which includes a strong STEM mentorship component. Packard's model (2016) describes "focus" as "intention" which essentially means developing a mentorship network to achieve limited goals at first. Over time, this network can be expanded to achieve additional program goals. Identification of military veterans currently on the university faculty and staff, primarily within CEIT, will offer the incoming veteran students access to a wealth of experience and information related to the ongoing transition, life at the university and academics in general. The familiar onboarding process used in various forms by most military units and services offers a good template and includes making contact prior to the student's arrival; assisting with inprocessing upon arrival; offering a personal advisor/mentor relationship; sharing social opportunities; and providing personal/academic feedback as appropriate.

Packard's research also indicates these on-boarding actions offer a viable means for making a positive impact on a veteran student's "interest" and sense of "belongingness." Identification of faculty and staff members who are also military veterans or strongly supportive of the veterans/students will thus offer a means of increasing veteran student "capacity" or efficacy over time. Given that veteran students typically arrive on campus well-motivated and with a good mix of intrinsic, attainment and instrumental goals, proper identification, development, implementation and support of a mentorship network based on faculty and staff mentors who have shared common experiences will allow each veteran student to more rapidly experience a positive transition

experience. Identification of "self-improvement" by servicemembers (Table 1) is indicative of their having a growth mindset. This means that, as veteran students, they believe they can improve their abilities. Dweck's research into the psychology of success (2006) shows that teachers and coaches, two professions with significant mentoring opportunities, can have the greatest positive impact by establishing high standards within a supportive learning atmosphere.[8] As the veteran students remain in their STEM programs and advance in seniority their expanded involvement in the mentoring effort and increased exposure to mentors and peers will broaden to include their service as peer mentors to fellow veteran students in younger year groups. Over time, the STEM mentorship effort should become self-sustaining and recognized within the veteran, engineering education and engineering technology communities.

Beyond Year 1, the authors anticipate expanding the longitudinal study by including the remaining colleges on campus that offer STEM degrees and have a veteran student presence. Presuming a quantifiable, positive impact in student efficacy measured by retention rates and satisfaction surveys, expansion of the mentorship effort may eventually include military servicemembers and dependents. As of the Fall 2015 semester, 865 of the 20,459 students (4.23%) at Georgia Southern University are using VA benefits to pay for their studies.

Conclusion

Research has shown that military and veteran students believe their military experiences provided them with the knowledge (skills and/or abilities) and discipline (will and/or motivation) to overcome obstacles, execute plans and achieve personal and group goals. Unfortunately large numbers of veterans describe encountering significant obstacles while using their earned VA benefits to pursue higher education opportunities. The key issue to mitigating those barriers appears to be how best to improve veteran student efficacy as it relates to their capability and motivation in pursuit of higher education goals the students themselves deem valuable. The authors have adapted a STEM mentorship program structure to focus on veteran students pursuing STEM degrees in the College of Engineering & IT at Georgia Southern University. In turn they will initiate a longitudinal study of the STEM mentorship program, supported by the college's Dean and Industry Advisory Board, starting in the August 2016 semester in an attempt to determine how best to improve the efficacy of veteran students and, as a result, increase both retention and graduation rates.

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