Poster: Are Our Students Engaged in Their Studies? Professional Engagement vs. Study Engagement

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ABSTRACT
Engagement has been shown to contribute to students' success. We used an NSSE-like survey and interviews to examine engagement of students registered in software engineering and information system engineering at Ben Gurion University of the Negev (BGU). The survey showed BGU students had generally lower engagement in comparison to US students except for in collaborative learning. BGU students lean towards perceiving their studies as a means for professional success rather than for traditional academic success. We attribute the differences between the students and their US counterparts to differences in culture and the age of digital media that allows for multiple ways of learning beyond the university.

CCS CONCEPTS
K.3.2 Computer and Information Science Education

KEYWORDS
Student Engagement; Student Motivation; NSSE; Survey

1 INTRODUCTION AND METHOD

The digital age is having a multifaceted effect on student engagement, caused by inreased distraction and stimuli, shifts in work opportunities and study patterns, as well as instant access to information. In this paper, we study student engagement via a survey and interviews with software engineering (SE) and information systems engineering (ISE) students at Ben Gurion University of the Negev (BGU). We compare with US NSSE data.

Engagement has three interrelated aspects [1]. The *cognitive* aspect addresses the extent to which students attend to and expend mental effort when learning. The *behavioral* aspect addresses the extent to which students actively respond to learning tasks. The *affective* aspect addresses students' investment in, and their emotional reactions to, the learning tasks.

Engagement is one of the most influential factors in educational success as discussed by Hazley [2], Duffy et al [7], Coates [8], Beer et al [9], Trowler [3]. Student motivation has been studied by Jenkins [4], Jones et al [5] and many others. In this paper, we contribute data to ongoing studies in of engagement and motivation with a focus on SE.

We adapted the National Survey of Student Engagement (NSSE) [6] to the context and culture of BGU, focusing on the following indicators.: Higher-Order Learning (HOL); Reflective and Integrative Learning (RIL); Learning Strategies (LS); Collaborative Learning (CL); Student-Faculty Interaction (SFI); Effective Teaching Practices (ETP). In our analysis we looked at NSSE data for both computer science and engineering programs. We also asked students about their preferred learning means, and reasons for selecting their program.

We obtained survey responses from 61 ISE and 75 SE students. Response rate was 22%. We separately analysed data for first-year students and for senior (2nd and 3rd year) students.

2 RESULTS

Major differences where scores were higher for NSSE than for BGU appear in Student-Faculty Interaction (SFI), and Effective Teaching Practices (ETP), where p-values were below .05 indicating statistical significance for both first year and senior students. This result held for both BGU programs, and whether CS or engineering data from NSSE was used. Other notable differences where NSSE results were better occurred in Reflective and Integrative Learning (RIL; p=.002 comparing senior students of BGU ISE to NSSE CS) and Learning Strategies (LS p=.002 comparing senior students of BGU SE to NSSE CS).

Notably, however, the Collaborative Learning (CL) indictor shows statistically significant better results for BGU, comparing both programs with NSSE CS data. BGU results also exceed NSSE engineering results, but by lower margins than NSSE CS.

We asked several questions on a 7-point scale (from low to high importance). Regarding their reasons for attending classes, the most prominent factors were (in decreasing order), the subject is difficult for self-learning (5.1), the instructor has good presentation skills (5.02), the subject is important (4.97), and the instructor is organized (4.85). This aligns with the opposite question: "what are the reasons for *not* attending class", where the most prominent factors were, the instructor does not have good presentation skills (5.5), the instructor is not organized (5.35), and the subject is easy for self-learning (4.14).

We asked the students to rate the extent to which their actual learning occurred via various practices. In Table 1 we present the averages of the learning habits on 7-point scale (from

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'to a minimal extent' to 'to a large extent'). The table is sorted with respect to the overall average from the highest to the lowest factor. The students clearly believe that most learning is done while doing homework and by utilizing summaries of the related material.

Table 1. Practices that Lead to Student Learning at BGU

	ISE		SE		
	FY (means)	SR (means)	FY (means)	SR (means)	Overall Average
Homework	5.44	5.22	5.39	5.47	5.38
Summaries	5.00	5.11	4.5	5.58	5.05
Board Writing	5.25	4.31	5.39	4.47	4.86
Digital Presentation	4.81	4.53	4.11	4.51	4.49
Group Learning	4.88	4.33	4.28	3.96	4.36
Videos	4.31	4.4	4.39	3.96	4.27
Class Discussion	3.81	3.62	3.11	3.14	3.42
Reception Hours	2.25	4.20	2.89	2.25	2.90
In-class activities	2.50	3.00	2.28	2.33	2.53
Text Book	2.00	2.00	1.17	2.21	1.85

4. DISCUSSION AND CONCLUSION

Success needs to be considered from the academic viewpoint, (student success in their studies), and from the professional viewpoint (student success in the profession). In BGU SE and ISE programs, the latter tends to be stronger: Table 2 shows that it is professional capabilities that most motivate students to select their program.

Table 2. Reasons for Choosing the Study Program at BGU

	ISE		**SE**		
Reason	**FY**	**SR**	**FY**	**SR**	**Mean**
Professional Capability	6.00	6.16	6.72	6.14	6.26
Interest	5.75	5.67	6.61	6.32	6.09
Income	5.69	6.00	5.78	5.65	5.78
Open Possibilities	5.94	5.91	5.28	5.44	5.64
Challenge	5.13	5.18	5.83	5.75	5.47
General Capabilities	4.50	4.18	4.44	3.91	4.26
Social Stands	3.63	3.80	2.44	3.44	3.33

At BGU, the drive to obtain work experience as soon as possible appears to limit the time that students can devote for their studies and this might be what leads many of our survey metrics, such as RIL and HOL, to be lower.

Another factor that might explain some of our findings is technology availability that makes self-learning easier than ever. These include full on-line courses (the use of which is encouraged in BGU), on-line forums, and open source projects. Such facilities decrease the need to be physically engaged with the studies, and may increase the sort of learning that can lead to a near-term job, while limiting higher-order learning as well as reflective and integrative learning, as reflected in our survey. It might be that the maturity of the BGU students (they often enter after national service or work experience) better allows them to leverage technology, with both positive and negative outcomes.

The advantages of the BGU students with respect to collaborative learning can most likely be attributed to the maturity of the students, their life experience, and the local culture as well.

What lessons can be learned for the broader software engineering education community and for further research?

Firstly, it would seem desirable to study cultural differences among SE programs to learn the type of engagement each university or country tends to favor. Perhaps there is nothing wrong with some universities focusing on professional success suitable to a wide variety of companies, and others focusing on deeper learning that can train future researchers or serve the needs of leading edge companies that need deep thinkers.

Secondly it would seem important to study in more depth the effects of technology and just-in-time learning on student engagement in our field. Software engineering students will clearly be among the most adept at the use of technology, and hence perhaps might be among the most distracted by it but also the most likely to use it to leverage their education.

The results of the NSSE questionnaire indicate lower engagement of BGU students. However, in practice, BGU alumni in both programs are in high demand and are successfully engaged in the world-wide work market, as well as in academia. This might call for domain specific adjustment of the NSSE questionnaire.

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