BPE: Assessing Student Satisfaction and Engagement in Teams (ASSET)

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Abstract

This project focuses on clarifying the definition and measurement of student engagement. This included exploring the extent to which burnout represents a low level of engagement or if it is a separate construct. Through a three-study process, we examined the factor structure describing a large set of published items from different sources, developed a new psychometrically sound scale, and conducted an additional psychometric evaluation of the final instrument. The final scale is comprised of six dimensions: *Enthusiasm, Exhaustion, Effort, Social Interaction, Resilience*, and *Focus*, with 24 items (four items per dimension) and measures student engagement with a repeated stem that can be modified to customize the referent of the questions.

Keywords: Student engagement; job engagement; burnout; scale development

Identifying the scope of "student engagement"

Student engagement is a goal of many educators, yet it is "weakly theorized".[1,p. 1005]
This project characterized the diversity of interpretations of "engagement" in a forthcoming paper,[2] finding that student engagement was variously described as participation (41%), interest (14%), motivation (12%), self-regulation and metacognition (12%), interaction with people or technology (12%), time invested (6%), and attention (4%). That paper provides an extensive literature review on measures of engagement and correlates, resulting in two research questions that led to the development of the Comprehensive Assessment of Student Engagement (CASE):

1. What is the domain and dimensionality of student engagement and to what extent does it include aspects of burnout?
2. How should student engagement best be assessed (i.e., can a valid and parsimonious measure of student engagement be developed)?

Sources for creating a new instrument

Five sources provided items to address our first research question:

1. The *Job Engagement Scale (JES)* by Rich, Lepine, and Crawford,[3]
2. The *Utrecht Work Engagement Scale for Students* (*UWES - Student Version)* by Schaufeli, Salanova, González-Romá and A. B. Bakker,[4]
3. The *School Engagement Scale* by Wang, Fredricks, Ye, Hofkens, and Linn,[5]
4. The *Burnout Assessment Tool (Short Form)* by Schaufeli, De Witte, Desart,[6] and
5. The *Oldenburg Burnout Inventory (OLBI)* by Demerouti, Mostert, and Bakker.[7]

Duplicate (or near-duplicate) items across the multiple instruments were removed.

Three studies leading to a final instrument

The forthcoming paper provides a detailed description of the methods used in three studies. Study 1 primarily used items selected from the multiple instruments above, noting that the development of the different instruments had taken varying approaches to defining engagement and we sought to develop a more comprehensive understanding. We received 1,436 valid response from a target population of 1,835 first-year engineering students from a large mid-western university in the U.S. From those responses, we identified the domain and dimensions of student engagement and burnout, yielding six factors: *Enthusiasm, Exhaustion, Effort, Social*

Interaction, Resilience, and *Focus*. Each of those factors included items from multiple source instruments, and no source instrument included all the factors identified, supporting the creation of a comprehensive instrument. Study 1 also showed that engagement and burnout overlap and should not be treated as distinct constructs.

Study 2 evaluated an instrument designed to focus on measuring those six factors, including eight original items to measure each. In anticipation of the need to apply the instrument to measure engagement at different levels of educational context (activity, unit of study, program, institution), each item was rephrased to have the common stem "When I'm doing schoolwork …". The instrument was administered to the same 1,835 target population, yielding 1,598 valid responses. Study 2 confirmed the six-factor structure while retaining six subscales that each had adequate internal consistency and discrimination across subscales.

Study 3 was designed to further evaluate and refine the measure while also explore its stability across semesters. Four items from each of the dimensions were retained and four items each were added to the *Focus* and *Resilience* dimensions to identify items that improved the reliability of those subscales. The target population was the same 1,835 students, who had since moved to a second-semester engineering course. The resulting final instrument had good psychometric properties.[2] Attempts to reduce the model to one factor as ("engagement") or two factors ("engagement" and "burnout") resulted in a poorer model fit.

Observations on changes in engagement over two semesters

From a first-semester engineering class to a second-semester class, *Enthusiasm* decreased (Cohen's d = .25), *Exhaustion* increased (d = .31), *Social Interaction* decreased (d = .21), *Resilience* decreased (d = .10), and *Focus* increased (d = .29). *Effort* remained unchanged (d= .03). The consistency of individual scores was estimated using the intra class correlations (ICC) across the two measurements of each subscale, finding that score levels were highly consistent across semesters both in terms of rank order and agreement. Thus, despite some mean-level differences across semesters, the results indicate that the CASE instrument has a high level of stability in student engagement.

Nevertheless, the observed mean differences suggest there is reason for further exploration of how engagement changes over time in engineering students and its relationship to persistence in engineering. Although the ICCs indicated that score levels had good consistency across two semesters, the observed increase in exhaustion and decrease in enthusiasm, social interaction, and resilience seem only offset by an increase in focus. This aligns with engineering students' cultural emphasis on individual accomplishment[8] and what has been called a "meritocracy of difficulty",[9] with some persisting in spite a loss of engagement.

Conclusion

Our project thus yields the following definition: *Student engagement is a multidimensional concept describing a student's state of enthusiasm, effort, social interaction, and focus directed*

at their studies, together with the capacity to sustain those activities due to sufficient resilience and limited or absent exhaustion.

The common stem used in the instrument can be easily changed to customize the scale's referent from the general "When I'm doing schoolwork …" stem we used in this study to a specific class, class activity, team project, etc. The final measure is available in the forthcoming publication[2] and we are making arrangements for it to be added as a supplementary instrument that can be collected in the CATME Team Tools System.[10]

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