Student and Faculty Perceptions on Plus-Minus Grading: A Case Study

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The decision of higher education institutions to grade student performance with whole letters or with pluses and minuses has many factors. In particular, student and faculty opinions on this choice require further study. Faculty at Southern Illinois University Edwardsville (SIUE) recently investigated recent opinions by reviewing literature and the grading practices of peer institutions, and by surveying both students and faculty at SIUE. The primary findings of the study indicated that 1) an overwhelming majority of students (83%) are satisfied with SIUE's current whole letter grading scale, 2) most faculty (59%) favored a change to plus-minus grades, and 3) students and faculty alike noted that accurate reflection of performance was the most important issue to consider when choosing a grading system. Based on the evidence collected, SIUE chose to retain the whole letter grading system for the time being.

The benefits and drawbacks of using a plus-minus grading scale versus a whole letter grading scale has generated a lot of discussion on campuses. Higher education institutions contemplating a switch to plus-minus grades have many factors to consider, including its impact on student motivation, grade point averages, grading accuracy, and faculty/student satisfaction. Although several studies have investigated faculty and student perceptions on plus-minus grades (Baker and Bates, 1999; Fisher, Wells, Wells, Thorne, Diebold, Schumacher, & Melching, 2003; Morgan, Tallman, and Williams 2007), varying results of those studies demonstrate a need for further studies on faculty and student opinions.

On the campus of Southern Illinois University Edwardsville (SIUE), faculty investigated if a more-detailed grading protocol might benefit the students and faculty. SIUE, a Carnegie Master's Intensive State Assisted University, serves a population of approximately 14,000 undergraduate, Master's and Doctoral students in the Midwest. Currently, faculty assign students whole-letter grades (A, B, C, D, or F) on their transcripts. In the spring of 2011, the SIUE University Curriculum Council charged the Academic Standards and Policies Committee with investigating if there is a demonstrated need to change the current grading system to a plus-minus grading system. The authors of this article formed the committee that conducted this investigation, conducting a review of the literature, reviewing the practices of peer institutions, and surveying the opinions of faculty/students.

The objective of this study was to measure the efficacy of changing from the current whole letter grading system to a plus-minus system. To reach this objective, the authors determined whether student and faculty populations were satisfied with the current whole letter grading system and their perceived benefits of the preferred grading system. A review of SIUE's peer institution grading practices and previous literature were also synthesized to inform the decision.

Literature Review

Literature about the effects of plus-minus grading is limited. Published studies most often use surveys to determine faculty and student support for this grading policy. Faculty and students cite more accurate grades as a benefit of this system, and negative impact on grades and a low benefit/cost ratio as downsides (Morgan et al., 2007). Faculty and students in favor of plus-minus grades cite more accurate grades as a benefit of this system, while those opposed consider a low

benefit/cost ratio as a downside (Morgan et al., 2007). In addition, students opposed to plus-minus grading believe it will negatively impact their grades (Morgan et al. 2007). More students oppose plus-minus grading than are for it; faculty are more evenly split (Fisher et al. 2003; Morgan et al. 2007). When given a choice, faculty with higher rank and more years of teaching experience are less likely to adopt plus-minus grading (Malone, Nelson, and Nelson, 2000).

Impact on Grade Point Averages (GPA) and Class Grades

The relation between plus-minus grading and student GPA remains inconclusive in the literature. At a private liberal arts college, researchers found a 2.1% decrease in GPA when applying the plus-minus grading scale to raw numerical grades from various disciplines for an academic year, thus indicating a reduction of grade inflation (Bressette 2002). No studies to our knowledge found an increase in GPA with the implementation of plus-minus grading, although some found no significant change in GPA (Fisher et al., 2003; Malone et al., 2000).

A couple of studies investigated student perceptions of plus-minus grading's effect on their GPAs and compared them to the actual GPAs earned. At the University of North Florida, 58.5% of students enrolled in a Principles of Management course felt plus-minus grades would lower their GPAs. Over three years, the aggregate GPA of 944 students enrolled in this course experienced no significant change; however, 13.7% of the enrolled students achieved a higher grade than if they had been graded with a whole-letter scale, while 12.2% earned a lower grade (Baker and Bates, 1999). In a similar study, Dixon (2004) found that students chose straight whole-letter grading over plus-minus grading; 154 students for the former versus only 70 for the latter. There was no significant difference between the number of A

grades earned between the two groups. Students choosing plus-minus grading earned more pluses than minuses, as well as more B grades (40.0% versus 27.95%) and fewer D grades (5.7% versus 15.6%) than those who chose whole-letter grading.

Implementing plus-minus grading may affect certain courses or disciplines more than others. When the School of Business at Seton Hall University implemented plus-minus grading, elective courses experienced a drop in GPA, while core courses remained stable (Wilamowsky, Dickman, and Epstein, 2008). At the graduate level at Ball State University, cumulative GPA did not change significantly after the implementation of plus-minus grading; however, the number of "A" grades received decreased, most notably in the humanities, arts, and education (Malone, Nelson, and Nelson, 2000).

Impact on Student Motivation

Some faculty believed that plus-minus grades would increase student motivation such that they would maintain a sufficient level of effort throughout the semester in hopes of achieving a slightly higher grade (Bressette, 2002). Several of Eastern Kentucky University's benchmarks cited increased student motivation as the reason for implementing plus-minus grading; however, faculty and students surveyed at EKU perceived plus-minus grades as having a negative effect on student motivation, as well as on student retention and scholarships (Fisher et al. 2003).

McClure and Spector (2005) tested the hypothesis that plus-minus grading would increase student motivation by allowing 135 students in economics courses to choose whether to be graded on a plus-minus scale or a whole-letter scale. The researchers found no significant correlation between the student preference for plus-minus grading and the percentage of total points earned in the courses. These

researchers cautioned that more research was needed before universities chose to incorporate plus-minus grading to increase student motivation.

Elikai and Schuhmann (2010) studied student motivation in a cost accounting course by assigning a control group the whole-letter grading scale and a treatment group a stricter scale where A = 93–100, B = 85–92, C = 75–84, D = 65–74 and F < 65 percent. This stricter scale matches what is required of students to pass the professional accounting exam. They found that students graded on the strict scale received higher test scores, particularly for those students with lower GPAs. These findings indicate that student motivation in relation to grading scales may depend on the area of study, as well as student achievement.

Other Considerations

Sophomores and juniors may oppose a change to plus-minus grades more strongly than other students, perhaps because they are more accustomed to whole-letter grades and anticipate fewer benefits from such a change (Morgan et al. 2007). Before changing to a plus-minus grading system, faculty and administrators should communicate with students to explain the reasons for the change and seek their input early on. Universities might also consider phasing in plus-minus grades, beginning with freshman. Malone et al. (2000) estimated that implementing plus-minus grading would cost approximately $70,000 and require 600 or more hours of work; thus universities considering such a change should be certain the benefits will at least equal these costs.

Method

In addition to reviewing literature on the topic, the authors reviewed the policies and reported actions of peer institutions, surveyed students, and surveyed faculty. During the study, peer institutions were defined as institutions that

were in the general geographic vicinity of our institution. Schools in Southern Illinois, as well as those nearby in the St. Louis Metropolitan area and even southern Missouri were examined in a primary effort to examine the grading process that competing institutions were offering their students and faculty, and secondly, to gain perspective about the issues and concerns that may arise during our study. After a review of the literature, we hypothesized that more faculty would prefer to transfer to plus-minus grades while students would be more hesitant to do so. We also hypothesized that the most important perceived benefit to plus-minus grades would be a more accurate reflection of grades.

Authors chose a survey methodology in which a representative sampling of student and faculty attitudes would be taken using a cross-sectional survey. The research question we were seeking to answer was "will students and/or faculty at SIUE prefer whole-letter grade reporting, which is the current grade reporting process, or will they prefer plus-minus grading?"

Survey Data Collection

The authors developed two web-based survey instruments to measure the opinions of the students and faculty/instructors. The authors aimed to collect a broad range of opinions from a variety of students, which included full-time, part-time, undergraduate, graduate, and professional; essentially any student who was enrolled in a course. Similarly, the definition of faculty herein includes full -time and part -time faculty, instructors, lecturers, and adjunct faculty.

The faculty survey contained 14 questions and the student survey included eight to nine questions, depending on their responses. During the survey design process, authors addressed mutual exclusiveness by either allowing respondents to "select the best" or "select all that apply" depending if the choices were exclusive of each other, or

dependent, respectively. Further, survey logic was used to allow respondents to skip sections that did not apply, depending on their answers to specific questions. For example, those responding in favor for a change were asked different questions than those opposed, albeit on the same topics.

The question design of both survey instruments were validated by soliciting comments from two expert panels (the University Curriculum Council and the Academic Standards and Policies Committee). The student survey was additionally subjected to a pilot test of students from multiple academic units on campus. After the survey was refined and approved by both the Institutional Review Board and the Office of Institutional Compliance, it was distributed electronically via the campus email system. Students and faculty members (as defined above) were sent unique links to the survey for their role at the University. The link allowed users to access the survey 24-hours a day from December 6, 2011 to January 5, 2012. Although users could stop the survey and finish at a later time, they could not access or change completed surveys.

Data Analysis

After the data were collected, the sample demographics from both students and faculty respondents were compared to the population at SIUE to validate the collection of a representative sample. Measures of effectiveness included academic year and academic unit for students and academic rank and unit for faculty. The distribution of faculty (Table 1) and students (Table 2) responding to the survey between academic units and progress in school is proportional to enrollment.

Table 1: Faculty academic rank reported from survey respondents and per fall 2011 employment (SIUE Fact book, 2011)

	Participant Characteristics	Respondents	Population	Difference
Academic Rank	Associate Professor	29%	28%	1%
	Assistant Professor	29%	31%	-2%
	Professor	21%	21%	0%
	Instructor	11%		
	Lecturer	7%		
	Adjunct Professor	1%	20%	-1%
	Other	1%		
	Visiting Professor	0%		
Academic Unit	College of Arts & Sciences	58%	49%	9%
	School of Education	14%	15%	-1%
	School of Engineering	10%	7%	2%
	School of Business	9%	8%	1%
	School of Nursing	4%	9%	-5%
	School of Pharmacy	3%	6%	-3%
	School of Dental Medicine	2%	5%	-3%

Table 2: Student academic progress reported from survey respondents and per fall 2011 enrollment (SIUE Fact book, 2011).

	Participant Characteristics	Respondents	Population	Difference
Academic Progress	Freshman	17%	21%	-5%
	Sophomore	18%	16%	3%
	Junior	23%	17%	5%
	Senior	24%	25%	-1%
	Graduate	18%	20%	-2%
Academic Unit	College of Arts & Sciences	35%	35%	0%
	School of Business	14%	19%	-5%
	School of Education	13%	24%	-11%
	School of Engineering	12%	9%	3%
	Undecided/Unknown	11%	2%	8%
	School of Nursing	10%	9%	1%
	School of Pharmacy	5%	3%	2%
	School of Dental Medicine	0%	1%	-1%

Findings

Peer Institution Practices

The committee reviewed 23 higher education institutions throughout Illinois and the greater St. Louis area by reviewing student and faculty handbooks available online and example syllabi. Of these colleges and universities, just over half (12, or 52%) use a whole-letter grading system, and seven (31%) report using plus-minus grades. Of the four institutions (17%) that use both plus-minus and whole-letter grading, three indicated the choice of whole-letter or plus-minus grading was the faculty's, and one reported that student's individually choose which grading system they prefer in each class.

This review also indicated that faculty at Northern Illinois University recently recommended changing from a whole-letter grading system to a plus-minus system (N.I.U. Faculty Academic Affairs Committee, 2011), and that Truman State University also considered this change but decided to maintain its whole-letter grading system in 2001 (Truman State Faculty Senate, 2001). Southwest Missouri State University is conducting ongoing research on the impact of their recent change to a plus-minus system (Anonymous, 2010).

Student Survey Findings

Of the 2,091 SIUE students (an approximately 15% response rate) that responded to this committee's survey about plus-minus grading, 71% percent of students were satisfied (or somewhat satisfied) with the current grading system, on average. This finding supports the literature that most students oppose a change to a plus-minus grading system (Baker and Bates 1999; Fisher et al. 2003; Morgan et al. 2007). As shown in Figure 1, student responses indicated consistent satisfaction among the various academic units. The authors normalized the data to show the percentage of responding

students in each school. Students from the schools of Pharmacy and Education showed the strongest satisfaction with a whole-letter grade system and those from the school of Nursing or those undecided were the least satisfied with whole-letter grades. Although the responses from students within the School of Dental Medicine were removed from Figure 1because of a small sample size, they followed the general trend of the other academic units. Additional analysis did not reveal any significant difference in the opinions of graduate versus undergraduate students.

Students that were satisfied with or neutral about the current grading system most-commonly stated that this grading system does reflect their performance accurately (see Figure 2a).The most common reason given for desiring a change was that the current grading system does not reflect their performance accurately (see **Error! Reference source not found.**2b). Students that were satisfied with or neutral about the current grading system most-commonly stated that this grading system does reflect their performance accurately (see **Error! Reference source not found.**2a). Thus, regardless of their preferred grading system, students agree that the key issue is the ability of any grading system to reflect their performance accurately.

The next key issue for both groups of students related to the ability of the preferred grading system to motivate them to work harder, followed by the grading system in which they are most familiar from previous experience.

Students surveyed at Northern Arizona University (NAU) who favored plus-minus grades also listed more accurate grades as the top reason for a change in grading systems, which was followed later by motivation to work harder and the fact that other schools use them (Morgan et al. 2007).
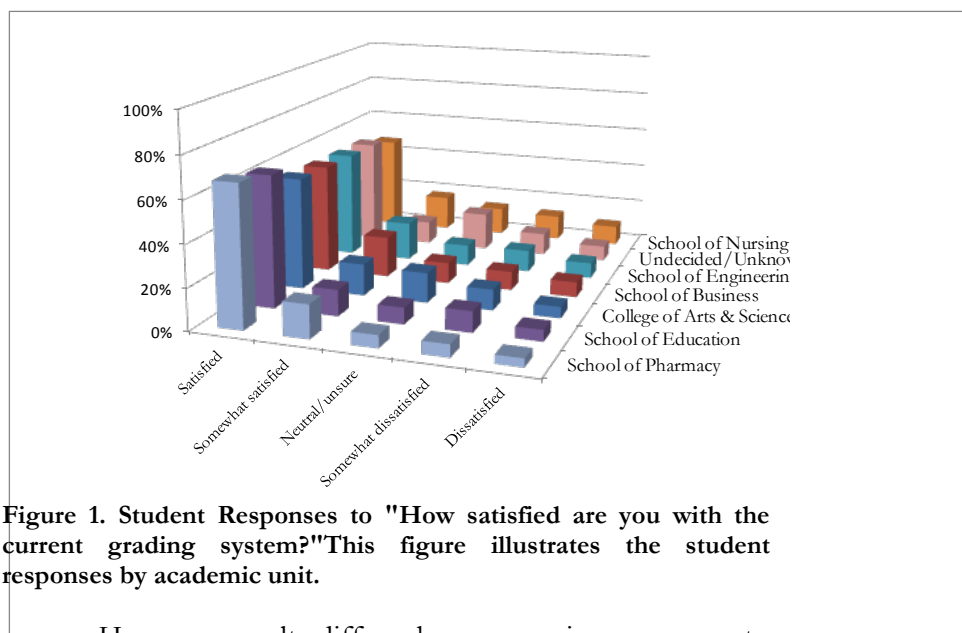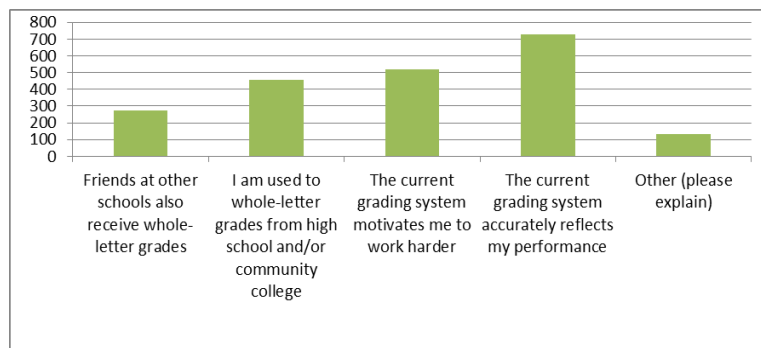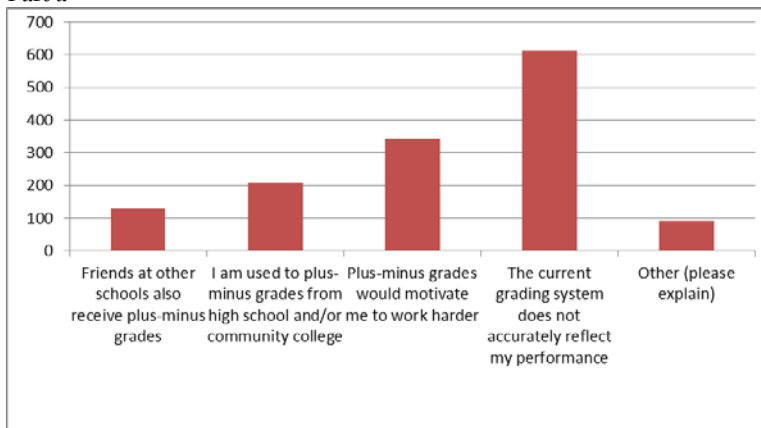
Figure 1. Student Responses to "How satisfied are you with the current grading system?"This figure illustrates the student responses by academic unit.

However, results differ when comparing responses to those who favor whole-letter grades. Whereas students at SIUE kept the same reasons in order as the students who favored plus-minus grades, students at NAU chose other reasons as more important. At NAU, students felt plus-minus grades would negatively impact their grades and saw no reason to change the system. Only a handful of students cited motivation and previous experience as reasons to keep whole-letter grades (Morgan et al. 2007).

Morgan et al. (2007) proposed resistance to change theory as a possible reason students prefer not to change to a plus-minus grading system. Our results indicate this is not the case since students in both groups cite their previous experience (15%) and friends' experiences less frequently (9%) than reflection of performance (44%) and motivation to work harder (25%). Even when examining these opinions for each academic unit, these trends remained consistent.

Part a

Part b

Figure 2. Student responses to "Which statement best describes your reason for being a) satisfied with the current whole-letter grading system or b) dissatisfied with the current whole-letter grading system (select all that apply)?" This figure shows student reasons for their level of satisfaction with the current grading system.

Survey results showed conflicting opinions about the impact of grading type on student scholarship awards, job offers, and change to overall GPA. During this portion of the survey, the participants were stratified into two populations based on their responses to their satisfaction: satisfied and dissatisfied (with current whole-letter grades). Both student groups were asked questions about the same topics, albeit with slightly different wording. For example, the satisfied students were asked, "If you have applied for jobs that required a college transcript, do you feel that the current grading system helped you in any way (for example, being viewed more favorably)?" and the dissatisfied students were asked, "If you have applied for jobs that required a college transcript, do you feel that the current grading system put you at a disadvantage in any way (for example, being viewed less favorably)?" The responses to these questions shown in Figure 3a) do not include those that have not applied to jobs requiring transcripts and have been normalized to a percentage of each population (n=678 dissatisfied, n=751 satisfied).
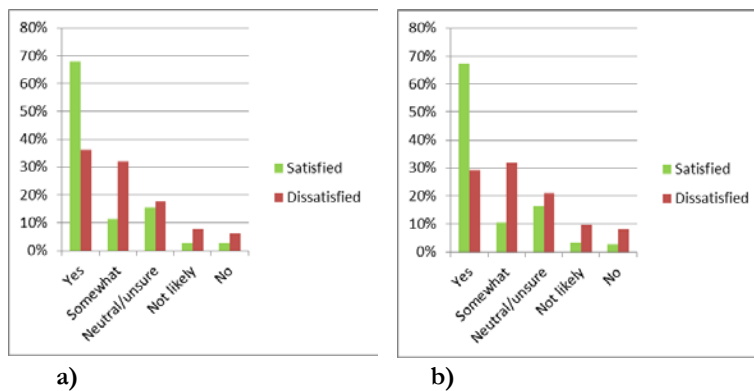

a)   b)

Figure 3. Student opinions of impact of whole-letter grading on a) their job obtainment and b) scholarship awards. This figure differentiates student perceptions of the impact of the grade system on their competitiveness.

Similarly, students were asked if they felt helped (for satisfied students) or disadvantaged (for dissatisfied students) with respect to scholarships they applied for that required transcripts. The responses to these questions shown in Figure 3b) do not include those that have not applied for scholarships requiring transcripts and have been normalized to a percentage of each population (n=703 dissatisfied, n=803 satisfied). Together, student opinions reported about job offers and scholarship awards indicates that students who were satisfied with a whole-letter grading system felt more strongly about its benefit than dissatisfied students felt disadvantaged.

Students that were dissatisfied were also asked, "On average, how many times per year do you think the current grading system inaccurately represented your final class grade on your transcript?" After removing unrealistic responses (greater than the number of allowable undergraduate classes per year), authors found that students estimated an average of 2.94 times per year. Further, regression analysis demonstrated that a Poisson distribution best fit the data (r=0.9976) because the mean and standard deviation were similar, 2.94 and 2.67, respectively.

Faculty Survey Findings

Of the 277 faculty (~31% response rate) that responded to the survey, approximately 59% percent favored (or somewhat favored) changing to a plus-minus grading system as shown in Figure 3.
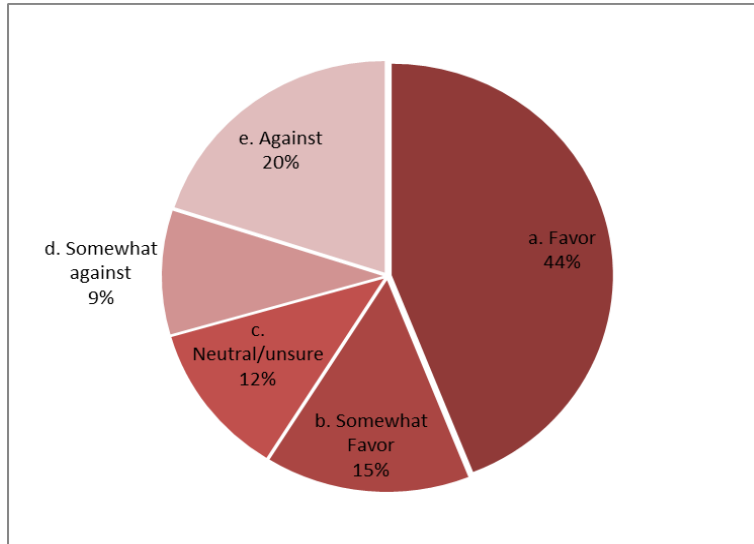
Figure 3. Faculty opinions on changing to a plus-minus grading system. This figure shows the proportion of faculty desiring a change to plus-minus grading.

Of those faculty members supporting this change, the most common reasons were so that student performance on transcripts could be reflected more accurately (53%) and because transcripts report higher grades than students earn (21%). This result corresponds with faculty opinions at other institutions (Fisher et al. 2003; Malone et al. 2000; Morgan et al.2007).

Faculty opposing a change to the grading system most commonly said that the current system already differentiates between individual students' performances on their transcripts adequately (24%) and believe that there would be an increase in grade appeals (22%).

Overall, 17% percent of faculty believe that changing the grading system would be difficult (or very difficult) to implement and approximately 50% percent think student grade-change requests will increase. Faculty at other

institutions also shared this concern about an increase in grade-change requests (Baker and Bates, 1999; Morgan et al. 2007).

Faculty survey participants reported an average of 14.5 years of teaching experience and were appropriately diverse in their distribution between SIUE units, academic ranks, and student populations taught. Comparing the years of teaching experience against faculty opinion on changing to a plus-minus grade system led to two conclusions. First, those with more experience were more solidified in their beliefs, as shown by fewer "neutral" and "somewhat" responses as experience increases in Figure 4. Second, faculty up to 20 years of experience consistently favored changing to plus-minus grading. For faculty with more than 20 years, the small sample size and high variability of responses make it difficult to draw further conclusions. It should be noted that this second conclusion is contrary to research by Malone et al. (2000) who found that faculty who had more years of
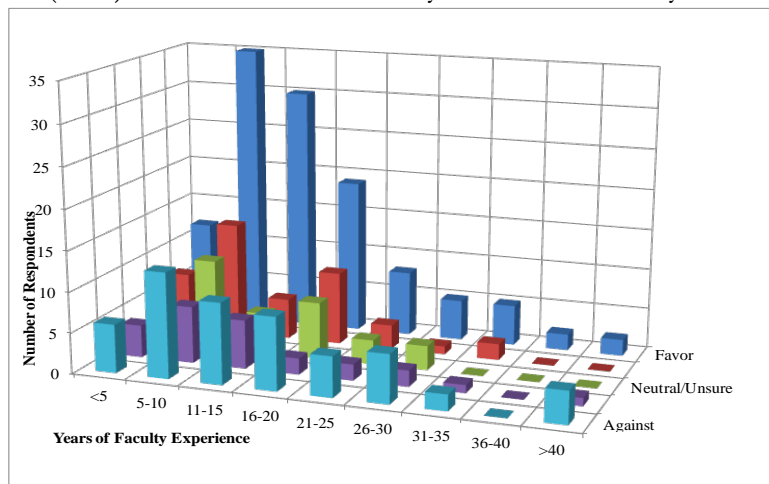

Figure 4. Faculty experience versus opinion on changing to a plus-minus grading system. This figure illustrates the trends in years of faculty experience versus opinion toward change of the grading system.

teaching experience were less likely to adopt the university's new plus-minus grading system.

Conclusions

The findings of this study guided the faculty at SIUE to maintain the whole-letter grading policy previously in place. Only 17% of 2,090 students survey respondents reported being dissatisfied with the current grading system, and although 59% of faculty reported being in favor of changing to plus-minus grading, the authors did not interpret this as overwhelming support for a change, especially when considering that many faculty, both for and against a change, stated that a change to plus-minus grading may increase the number of student grade appeals, possibly increasing work load for those involved in the process.

The faculty survey also suggested that those with 20 years or less of experience were consistently in favor of changing to a plus-minus grading system, which conflicts with other earlier research. Future work could investigate the root of this difference.

Findings from the student survey implied that students who prefer whole-letter grades and students who prefer plus-minus grades both reported that their opinion was most influenced by a grading systems' ability to assess performance accurately and to motivate them to work harder, over any other factors. More research on student perceptions of how faculty should grade their performance and effort would determine whether students that were dissatisfied with a particular grading system or the faculty grading processes. Additionally, future work focused on the impact to particular academic units could suggest reasons for some of the differences of student opinion between these populations.

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