

Learning not to lose: a deficit model prevalent in our learners

Chris Browne and Sarah Blocklock
Research School of Engineering, The Australian National University
Corresponding Author Email: Chris.Browne@anu.edu.au

CONTEXT

A university education should challenge and stimulate a learner. However, too often learners are focussed on achieving assessment results rather than achieving learning outcomes. A focus on results can lead to stress, which can manifest as a degradation in confidence, self-worth and self-efficacy in both the student's university and social life. With the focus on results, we explore whether students perceive that they earn or lose marks, and whether this changes over year levels. Understanding how students perceive their mark will allow a better pathway for developing assessment and study environments that improve the student experience.

PURPOSE

We examined whether students had a perception that they earned or lost marks, given a particular mark out of 10.

APPROACH

We surveyed cohorts of students from first to final year asking them to decide whether they earned or lost marks given a particular mark out of 10. Individuals were randomly assigned a particular mark between 6 and 9. These data were analysed to explore whether students perceived they had earned or lost marks, and whether this perception changes as the mark improves or as the progress through the degree.

RESULTS

Our data suggests that students are more likely to consider that they have 'lost' marks, even when they receive a mark of 9/10,

CONCLUSIONS

This research demonstrate that a 'loss' mental model is prevalent in our learners, emphasising what is already known about a focus on grades rather than learning. This observation could lead to initiatives that help match the expectations between faculty and students.

KEYWORDS

assessment, grades.

Introduction

University students are consistently exposed to the stresses that accompany grading. This stress can manifest as a degradation in confidence, self-worth and self-efficacy in both the student's university and social life (Strobino et al., 2002). However, little work has been done to understand how engineering students perceive their marks. In a pilot study, we investigate whether students perceive grades as either a mark that they 'lose' or a mark that they 'earn'. Results were gathered through a survey of students across four years of an engineering program. Understanding this distinction will inform how coursework should be framed and how we can align the expectations between student and instructor.

Great expectations

Students are motivated to achieve marks based on their career aspirations, the financial prospects associated with their future careers, and their desire to improve their intellectual and personal capabilities (Bryne et al., 2012). Success in modern higher education is achieved by students who meet the demands of regular assessments and achieve higher marks. Because of this, students are highly attentive towards the marks they receive and are affected—at times, detrimentally—by these marks. The effect of grading on students' mental health has also shown that students undergo psychological distress and potential long-term harm to mental wellbeing as a result of not meeting their expectations (Strobino et al., 2002; Nesbit and Burton 2002; Tippin et al., 2012; Villarreak et al., 2015; Reddan, 2013).

there are also substantial inconsistencies between different student's perceptions of an earned grade. Greenberger et al (2008) found that 40% of students felt doing the majority of required readings for a course entitled them to a B grade, where as 34% felt a B should be earned just by attending the majority of their classes. This leads to an insight that modern students possess a sense of entitlement, where achieving high grades is expected and not earned. Further, faculty expectations and priorities are often not aligned with student expectations (Tippin et al., 2012; Greenberger et al., 2008), and tension arises when students do not receive a mark they expected, effecting their confidence in their work and at times resulting in them disconnecting from the learning process (Strobino et al., 2002).

Grades have been shown to be an indicator of later educational success. Students who expect to receive higher marks over a long term period go on to attain higher levels of education when compared with students that aim lower. When these expectations are only set in the short term, and not met, it has been found that students attained lower levels of education and were unsatisfied with their long-term educational achievement and capabilities (Villarreal, 2015). Further, students are poor at estimation of test-performances, most often over-estimating their final score (Chevalier, 2007). There is no consistent data that indicates reasoning behind, or how accurately, students at university perceive their results.

Approach

To investigate student perceptions of marks, we conducted a survey with students from first to fourth year of the engineering program at The Australian National University. The survey was designed only to investigate whether students had different perceptions of 'earning' or 'losing' marks when different grades were given. The survey was administered to students in all stages of their degree, allowing us to also investigate whether these perceptions differ at different year levels.

Survey design

The survey was intentionally simple, designed only to investigate whether perceptions changed with the marks received. The primary question (Q1) asked:

*Consider a situation where you receive a mark of X out of 10.
Do you think you have a) earned X marks; or b) lost (10-X) marks.*

Where X took the values 6, 7, 8, and 9. Students only completed one survey, and were randomly assigned to these treatment groups, referred to as: Six, Seven, Eight and Nine.

Other basic demographic data were also collected, including whether the course in which they completed the survey was compulsory, whether they were an international, mature-age, their gender and their year of study. An example of the survey is shown in Figure 1.

Figure 1: Example individual survey given for the ‘Six’ treatment group.

INDIVIDUAL SURVEY

Q1: Consider a situation where you receive a mark of 6 out of 10. Do you think you have:

earned 6 marks lost 4 marks

Q2: Is this course compulsory for your study?

yes no

Q3: Are you an international student?

yes no

Q4: Are you a mature age student?

yes no

Q5: Your gender _____

Q6: Your year of study:

first second third fourth+

*Thank you for completing this survey.
Please place into the envelope provided to your class.*

Q2 was asked as the survey protocol required that the surveys were conducted in compulsory engineering subjects. Students who answered ‘no’ to this question were likely to be non-engineering students. Q3 and Q5 were the key demographic categories of interest in the study, as students from an international background may have different expectations of grades. Q4 was used to examine whether mature-age students had a different expectation of grades. Q6 was used to understand progress through the degree program, as even though a student may be in a certain-year course, they may not be that year of study.

Participant demographics and recruitment

Students were recruited during tutorials across compulsory courses through the four years of the ANU engineering program. All the surveys were conducted in the first semester of 2016 during tutorial sessions. Approximately five minutes were allocated for students to complete surveys. The survey had Human Ethics approval, participation was voluntary, and students were not paid or otherwise incentivised to complete the survey. Treatment groups were

randomly allocated, and students were not aware of differences in their questionnaire until the conclusion of the activity. Table 1 shows the general breakdown of the participant demographic by treatment condition.

Table 1: Frequency of participants demographic data by treatment condition

		Total	Treatment Condition			
			Six	Seven	Eight	Nine
Year level	1	202	44	54	51	53
	2	68	18	18	20	12
	3	111	29	27	25	30
	4	101	29	25	22	25
Gender	F	113	35	35	17	26
	M	365	83	89	100	93
	na	4	2	0	1	1
Status	domestic	319	83	76	83	77
	international	163	37	48	35	43
Degree	engineering	375	94	91	96	94
	other	97	24	31	21	21
	na	10	2	2	1	5
Mature age	yes	162	34	48	39	41
	no	320	86	76	79	79
Compulsory Course	yes	452	111	116	110	115
	no	30	9	8	8	5
Total		482	120	124	118	120

All treatment groups demonstrate a similar demographic make up, except for the gender balance in the Eight treatment condition. Eight had a significantly different make-up ($p = 0.03$ using Fisher's Exact Test), and could present bias if there is a difference in the perceptions of female and male students.

There were more participants from first year, and fewer participants in second year. One explanation for this is the timing of the survey in the respective courses: in first year, the surveys were held towards the end of semester, when information about the final assessment was being given; in second year, the surveys were given in a week without course assessment, and when other courses were having mid-semester examinations. However, as the spread between treatment groups is approximately equal, any effect should not bias one treatment category over another.

One further complication with the interpretation of results is that the first-year course is often taken by students not enrolled in the engineering program, such as computer science and software engineering students. The frequency of participants by year level and field of study is shown in Table 2. This demonstrates that the field of study reported by participants is different in first year compared to other years, and could present a bias in the results if the perceptions are different between engineers and non-engineers.

Table 2: Frequency of participants by year level and field of study

		Total	Field of study		
			Engineering	Other	NA
Year level	1	202	109	83	10
	2	68	61	7	0
	3	111	105	6	0
	4	101	100	1	0

Interpretation of surveys

The paper-based surveys were double-entered through a web-based form and a spreadsheet. Discrepancy between data sets were reconciled line-by-line. The interpretation of survey data was straight-forward, requiring minimal coding or categorisation, as most questions were tick-box.

There were two text-based responses on the survey: gender and field of study. For gender, no student reported a gender other than female or male. For field of study, many different responses were reported. Students that reported engineering, or variants of the degree including combined degrees were classified as 'engineering'. 'Other' was any other field, including computing, software engineering, science or other subject. 'NA' was used to report students who did not respond to the question.

A surprising result in the demographic data is the number of mature-age students, which cannot be that high (33%) given university demographic statistics. We note that the number of mature age students is similar to the number of international students. We subsequently consulted a small number of international students, who suggested that they considered themselves as mature-age compared to domestic students, as many had completed a diploma in their home country. Given the ambiguity of the interpretation of this question, it was not considered further in the interpretation of results.

Results

Here, the four treatment groups and the relevant demographic data are examined in relation to the answer provided Question 1: whether there's a perception of 'lost' marks or 'earned' marks.

Prior to the reporting of results, the two demographic categories of concern, gender and field of study, are briefly examined to screen for potential bias between categories. The results are shown in Table 3. Gender is not considered to be an influential factor, whereas the field of study was a significant determining factor ($p = 0.003$; 95%CI: 1.25-3.27; OR: 2.02).

Table 3: Frequency of participants by year level and field of study

		Total	Result category		p-value
			Earned	Lost	
Gender	F	113	46.0%	54.0%	$p = 0.923$
	M	365	45.2%	54.8%	
Degree	engineering	375	41.3%	58.7%	$p = 0.003$
	other	97	58.8%	41.2%	

Note: NA results not reported in this table

Engineering students clearly have a different perception of grades than students in the 'other' category. This is considered further in the discussion. This observation has the potential to skew results across years, as there are proportionally more non-engineering students enrolled in the first-year class, shown in Table 2. For this reason, only the 375 students who identified as studying 'engineering' are considered further in the interpretation of results. The results for the treatment condition and against the remaining demographic data are reported in Table 4.

Table 4: Frequency of participants by treatment group and demographic category

		Total	Result category	
			Earned	Lost
Treatment Condition	Six	94	34.0%	66.0%
	Seven	91	39.6%	60.4%
	Eight	96	43.8%	56.3%
	Nine	94	47.9%	52.1%
Year level	1	109	44.0%	56.0%
	2	61	31.1%	68.9%
	3	105	40.0%	60.0%
	4	100	46.0%	54.0%
Gender	F	90	46.7%	53.3%
	M	282	39.4%	60.6%
	N/A	3	-	-
Status	domestic	251	43.8%	56.2%
	international	124	36.3%	63.7%
Total		375	45.4%	54.6%

There are some noticeable trends in the treatment group and the year level categories. For all treatment groups, more students reported 'losing' marks than 'earning'. As students obtain a higher mark, they were more likely to perceive this as 'earned'. At a mark of 6, approximately one-third of students report earning marks (34.0%), increasing to approximately half of students at nine (47.9%).

A different trend occurs when examining across year level, with second-year students showing a greater tendency to report losing marks (earn: 31.1%) compared to other year levels. For both gender and status, more students reported 'losing' marks than 'earning'. However, females (46.7%) were more likely than males (39.4%) and domestic students (43.8%) were more likely than international students (36.3%) to report earning.

Discussion

Mindsets of earning and losing

The survey design was limited to investigating whether there was a difference in grade perceptions using the binary indication of earning or losing. Having established that students are more likely to report having lost marks, further work is required to understand why.

For example, the mindset of losing marks could be explained by both a student not meeting their own expectations (i.e., “I lost marks because I didn’t put enough effort into the assignment”) or through having marks taken away (i.e., “I lost marks because the marker was hard”). Likewise, a student could receive a high mark without the perception that they had earned it. Understanding whether the loss mindset is considered by the student as something that is inside or outside of their control will provide some guidance as to whether perceptions could be changed through different approaches to teaching.

Further, it is also unclear whether these opinions are related to perceptions of effort. For example, a student who works hard may either interpret their mark as something they have earned through hard work, or have lost despite all of the hard work. Perceived difficulty could also be a factor, with students who have received bad marks for a known-to-be-difficult course or task perhaps interpreting their marks as earned. Again, different teaching strategies might be required to assist students in the earn or loss mindsets.

Developing this concept further, Q1 did not state what type of assessment the mark out of 10 was for, leaving it to the imagination of the student. Different types of assessment, even at the same weighting, are likely to have different expectations around them. For example, in assessment that encourages convergent thinking, such as a problem set, marks may be more likely to be ‘taken off’ when the answer is not correct. In assessment that encourages divergent thinking, such as a research essay, marks are likely to be awarded in a more holistic manner. However, it is not possible to discern what type of assessment students were considering in Q1.

Background knowledge or domain expertise may also be a factor. As shown in Table 3, students who identified as not in the engineering program were the only category of learners that were more likely to earn marks. This could be explained in two ways: students who are not strictly in the engineering program find studying engineering harder and thereby feel like they have earned marks, or perhaps students from outside engineering have a different outlook. Efforts need to be made to understand why these different mindsets to improve overall engagement in learning.

Perceptions of marks earned by treatment group

As shown in Table 4, the perception of earning marks increases as the marks improve. The four treatment groups were chosen deliberately in the context of the ANU grading system, which considers 60% as a credit, 70% as distinction, and 80% or greater as a high distinction. The range of the treatment group aligned with these grade boundaries, from 6/10 to 9/10. It is unlikely—though untested—that any student receiving 10/10 would have perceived that he or she had lost marks; likewise it is unlikely that any student receiving less than 5/10 would have perceived that he or she had earned marks.

However, for a mark of 9/10, only 47.9% of students consider this as having earned marks. This is an alarming result, and provides an insight into the high expectations of students. A possible explanation for this high-level of expectation is the framing of the question as being out of 10. In the engineering program at ANU, small assessment tasks are often easier to complete, such as quizzes, worksheets or lab reports, than larger-weighted tasks, such as final exams. A question that considered a mark with a larger weighting, such as a 50% exam, might elicit a different mindset.

Perceptions of marks earned by year level

Second-year students were the most likely to report losing marks. The difference in second year could be explained by lower numbers of students reporting they are in second year. The surveys were conducted during an academically busy time for second-year students, perhaps exposing a bias in the perception of students attending this tutorial.

There are, however, alternative explanations that support this behaviour. The result from first year students was obtained before any first-year student had received a final course mark in their university career. The trajectory for a student in the degree could be interpreted as first, a level of optimism, followed by a more pessimistic outlook in second year, which is followed by a rebuilding in fourth year.

Conclusion

It is clear from previous work that the relationship between grades and expectations can lead to undesirable outcomes, such as mental wellbeing. Further, this work has identified that students, have an unreal and rather negative perception of results, with only 47.9% of students reporting that they have 'earned' a mark of 9/10.

The direction forward around this issue is not clear, and further work is required to understand why these perceptions exist. This needs to be coupled with strategies for teachers to help learners meet and exceed their expectations. Shifting the focus away from an obsession of marks to an obsession about learning could be one possible strategy to address this issue.

Bibliography

Byrne, M., Flood, B., Hassall, T., Joyce, J., Montañó, J. L. A., González, J. M. G., & Tourna-Germanou, E., 2012, Motivations, expectations and preparedness for higher education: A study of accounting students in Ireland, the UK, Spain and Greece. In *Accounting Forum* (Vol. 36, No. 2, pp. 134-144). Elsevier.

Chevalier, A., Gibbons, S., Thorpe, A., Snell, M., & Hoskins, S., 2009, 'Students' academic self-perception'. *Economics of Education Review*, 28(6), 716-727.

Greenberger E., Lessard J., Chen C., Farraggia S. P., 2008, Self-entitled college students: Contributions of personality, parenting, and motivational factors. *Journal of Youth Adolescence* 37: 1193–1204.

Languador, 2013 (TBA)

Nesbit, P., and Burton, S., 2002. Student Perceptions Following Assessment: An investigation of the effort reward relationship and its impact on efficacy cognitions. *Celebrating teaching at Macquarie*. Macquarie University, Sydney, pp.28-29.

Reddan G, 2013. To grade or not to grade: Student perceptions of the effects of grading in course work – integrated learning. *Asia Pacific Journal of Cooperative Education*, 14(4), pp.223-232.

Strobino J, Gravitz K, Liddle C, 2002. Student Perceptions of Grades: A Systems Perspective. *Academic Exchange Quarterly*, 6(1), p145.

Tippin G, Lafreniere K, Page S, 2012. Student perception of academic grading: Personality, academic orientation, and effort. *Active Learning in Higher Education*. 13(1), pp. 51-61.

Villarreal B, Heckhausen J, Lessard J, Greenberger E, Chen C, 2015. High-school seniors' college enrolment goals: Costs and benefits of ambitious expectations. *Journal of Adolescence*. 15, pp. 327-340.