Moving forward with assessment: Are marks necessary? Is there an authentic alternative for introductory courses?

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Abstract. Students have been trained to use marks as a proxy to judge what is important in our courses and their level of understanding. Viewing educational success only via grades can be an impediment to deeper understanding and learning. We know that a fixed mindset, where students believe that grades measure how smart they are, gets in the way of learning and growth and can also entrench privilege, with students from schools with well-trained physics and maths teachers being unfairly advantaged. It is possible to remove grades from introductory physics courses while conveying high-expectations and providing appropriate scaffolding using hurdle tasks.

Introduction: the problem with grading

Meaningfully assessing and attributing a value, number or descriptor, to student learning continues to be a challenge, especially with mass education. This is being exacerbated by ready access to generative AI such as ChatGPT which can lead to questions of integrity surrounding certain tasks. Assessment serves the dual purpose of measuring performance and achievement (summative) alongside contributing to learning and development (formative) which can impact on grade integrity [1]. Trina Jorre de St Jorre and David Boud, a long-standing assessment expert have outlined how assessment can be inequitable, perpetuating dominant social structures and power relations [2]. Issues around assessment have led some to question whether marks and grades are necessary [3] or whether we can better meet students' learning needs if we do not need to produce and justify a mark.

Competency-based Grading

The COVID-19 pandemic has led to a rethinking at many institutes about how best to deliver content but also about how to effectively assess students and provide feedback. A useful model to consider is competency-based grading. In this paradigm, students need to demonstrate competence and mastery of all required material to pass the course. There are many ways to implement this, with one approach being the use of hurdle tasks with multiple attempts. This gives students the opportunity to learn from their mistakes, incentivizing them to work towards mastery of the content and skills. This takes the focus away from performing for a test and places it on learning with formative assessment with the associated advantages to student participation and learning [4].

There are numerous advantages to competency-based grading. Students must master each part of the course; for example, they can't pass by excelling in the lab while failing the theoretical exam—they need to master all aspects of the course. Students tend to form a tighter learning community with their peers; they do not perceive that they are competing for marks but are instead striving to show their own competence. This helps increase their sense of belonging. First-year physics marks are highly correlated with how students have performed in high-school physics and mathematics [5], entrenching privilege. Having no marks in the first year helps each student reach the required standard without punishing those who did not have the benefit of a physics-trained teacher at school.

I have implemented pass/fail grading for a large introductory physics course (around 1700 students per year) at UNSW. There are three hurdle tasks the students need to pass: lab, a test on mechanics, and a test on waves and thermal physics. The change to competency-based grading has been well received by the majority of students. It has reduced staff workload and corresponded with greater student participation in forums and more evidence of students helping other students. We are now looking at how to introduce similar changes to other courses across the university.

A competency-based grading framework aligns well with what self-determination theory [6] tells us about psychological needs for growth and development: students are supported in mastering the material; they are not competing and therefore form better relationships with their peers; students have the autonomy to decide how much effort they need to expend on a task to demonstrate mastery, without the extrinsic motivation of grades. This option is worth careful consideration when planning assessment. It has the potential to overcome many of the concerns around academic integrity arising from the availability of generative AI.

References

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