

## Making the Case for Pass-fail Grading in Dental Education

**Running head:** pass-fail commentary

1. Vidya Ramaswamy, PhD (corresponding author)

Associate Director for Curriculum and Program Evaluation

University of Michigan School of Dentistry; [ramaswav@umich.edu](mailto:ramaswav@umich.edu)

2. Brandon Veremis, DDS

Assistant Professor, Department of Pathology, the Mount Sinai Hospital, New

York, NY; [brandon.veremis@mountsinai.org](mailto:brandon.veremis@mountsinai.org)

3. Romesh P. Nalliah, DDS MHCM

Associate Dean for Patient Services, Clinical Professor

University of Michigan School of Dentistry; [romeshn@umich.edu](mailto:romeshn@umich.edu)

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/EJE.12520](https://doi.org/10.1111/EJE.12520)

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2 DR. VIDYA RAMASWAMY (Orcid ID : 0000-0002-1439-2346)

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5 Article type : Commentary

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8 The purpose of this paper is to explore the benefits of pass-fail grading as opposed to the more  
9 frequently used letter grade system in dental education. A pass-fail system can enhance student  
10 wellbeing, facilitate intrinsic motivation, and promote competency based education. Although this  
11 review is primarily based on literature from North America, this discussion is still relevant to European  
12 audiences because the issue of pass fail is an inherent grading issue in all types of education.

13 There are two kinds of grading schemes that fall on a continuum ranging from the use of only  
14 letter grades to being entirely pass-fail through the curriculum. In most US dental schools using a pass-  
15 fail curriculum, students are given a numerical score for written/clinical assignments, clinical  
16 assignments and other types of assessments. These numerical scores are converted into letter grades  
17 using predetermined conversion criteria. A passing cutoff is then determined, and sometimes grades  
18 higher than this cutoff are given an honors designation.<sup>1</sup> Thus, formative grades may rely more on letter  
19 grades, and summative decisions of pass-fail are more tied to assessment of the student as  
20 competent/not competent with respect to certain criteria.

21 Currently there are at least 8 dental schools using a pass-fail grading system in the U.S.  
22 (<https://www.perio.org/sites/default/files/files/PDFs/Postdoc%20Education/ADEA%20Grading%20Resource%20Guide.pdf>). Most U.S dental schools still use the traditional letter grade system.<sup>2</sup> The use of  
24 letter grades can skew the assessment of competence in a number of ways. One, overall grade point  
25 average (GPA) may be more reflective of high credit courses even if some lower credit courses are more  
26 significant for dental education.<sup>3</sup> Two, students may pressurize faculty to increase grades, causing grade  
27 inflation.<sup>4</sup> Third, in a letter grade system, students may be promoted from year to year or even to  
28 graduate despite F grades in some areas. Fourth, grades can push students towards performance

1 motivation as opposed to mastery motivation, negatively impacting a desire to learn for the sake of  
2 learning by focusing too much on grades.<sup>5</sup> Given that the letter grade system is problematic, the  
3 following paragraphs lay out the argument for adoption of a more pervasive pass-fail grading system.

4 Pass-fail grading promotes student wellbeing

5 An extensive body of research has found a high level of stress and burnout among dental students.<sup>6-10</sup>  
6 One study reported that approximately half of dental students in Trinidad were in the clinical range for  
7 stress.<sup>10</sup> Another study assessed perfectionism, psychological adjustment, and the impostor  
8 phenomenon (a condition where high-achieving people constantly question their abilities and fear that  
9 their peers will discover that they are intellectual frauds) in health professions students (medical, dental,  
10 nursing, and pharmacy). The results of this study showed that 30% of all health professions students  
11 were in the clinical range for the impostor phenomenon, 27.5% were in the clinical range for  
12 psychological distress, and 21% of the sampled population had equal or greater stress than the typical  
13 undergraduate seeking mental health services at that particular university.<sup>11</sup>

14 Grades have been identified as a cause of stress. Students in schools using grading scales with  
15 three or more categories had significantly higher levels of stress, emotional exhaustion,  
16 depersonalization, and burnout, and to more seriously considered dropping out of school, compared  
17 with students in schools using pass-fail grading.<sup>12</sup> There is evidence from a dental school in Pakistan that  
18 moving away from the letter grade system leads to decreased stress and an increase in wellbeing.  
19 Students in a pass-fail assessment system had a significantly lower score on the Westside Test Anxiety  
20 Scale and the Perceived Stress Scale, indicating lower levels of test anxiety and overall stress than in  
21 students enrolled in the letter grade assessment system. The students in the pass-fail system were also  
22 more satisfied with their performance.<sup>13</sup> At the University of Virginia, the curriculum was changed to  
23 support a two-interval (pass-fail) system with cumulative honors rather than a five-interval (A, B, C, D,  
24 and F) system.<sup>14</sup> The result was significant increases in students' perceived wellbeing and personal life  
25 satisfaction for the first three semesters, as well as a significant increase in their satisfaction with their  
26 education. Similarly, student satisfaction with their learning curriculum increased, and average scores  
27 for courses remained above passing at the University of Michigan Medical School after they transitioned  
28 to a pass-fail grading system.<sup>15</sup>

29 The feeling of wellbeing is associated with multiple benefits. Studies note increased group  
30 cohesion and decreased competition while still performing well as a result of pass-fail curricula.<sup>16</sup>

1 Surveys administered to the pass-fail class showed students felt they had more time to explore  
2 additional academic interests and improve overall personal wellness.<sup>17</sup> A pass-fail curriculum may also  
3 support student wellbeing by encouraging participation from students from different educational  
4 backgrounds,<sup>17</sup> facilitating a more diverse learning environment.

5 Pass-fail grading promotes intrinsic motivation

6 A dental education workgroup identified a positive academic environment as one in which there  
7 is a focus on learning rather than performance, encouragement of collaborative learning, and  
8 opportunities for continuous self-assessment.<sup>18</sup> A curriculum that encourages a positive environment  
9 should push students to be motivated by learning itself (intrinsic motivation) rather than extrinsic  
10 factors.<sup>19</sup> This kind of curriculum would discourage students from memorizing “isolated facts” for a  
11 grade that has little bearing on career performance. Dental students traditionally are worried about  
12 their grades<sup>5</sup>, and workload,<sup>20</sup> and fear failure,<sup>5</sup> which favors conditions for promoting extrinsic  
13 motivation (getting a better grade) rather than intrinsic motivation (learning the information for  
14 learning’s sake). A pass-fail system can create a supportive learning environment<sup>21</sup> where students are  
15 focused on learning to think critically and evaluating evidence, which are the principal goals of dental  
16 education.<sup>22</sup> In a series of three studies in samples of students enrolled in a psychology course,<sup>23</sup>  
17 findings indicated that a graded test induces performance-avoidance goals and cognitions related to  
18 self-esteem (ego involvement) as opposed to learning for mastery of the subject matter. Similarly,  
19 grades create a preference for the easiest task and diminish critical thinking and therefore may not be a  
20 good indicator of competence.<sup>24</sup> In contrast, a pass-fail grading system can have a positive impact on  
21 intrinsic motivation and professional identity, without impacting achievement.<sup>25</sup>

22 Intrinsic motivation and autonomous self-regulation have a deep impact on student learning. A  
23 personalized and student-centered teaching style has the potential to improve student learning and  
24 facilitate intrinsic motivation.<sup>26</sup> This style is manifested through timely and constructive feedback, team  
25 work, and the presence of an autonomy supporting environment that allows students to value academic  
26 activities and not grades.<sup>27</sup> If a student is learning to learn (intrinsic motivation) and taking responsibility  
27 for their own learning, this will help to create healthcare providers capable of lifelong learning and  
28 evidence-based dental practice. Most importantly, all of these behaviors confirm the basic tenets of self-  
29 determination theory,<sup>19</sup> which suggests that intrinsic motivation is tied to a growth mindset, deep  
30 learning, better performance, and well-being and is achieved through satisfaction of the needs for  
31 autonomy, competence, and relatedness, all of which contribute to a humanistic environment.<sup>19 28</sup>

## 1 Pass-fail grading promotes competency based education

2 In 1990, George Miller put forth a 4-layer pyramid for assessing clinical competence.<sup>29</sup> (See  
3 figure 1). An example of the type of assessment at each of these levels is as follows: Knows (written  
4 exams); Knows how (clinical problem solving exercises); shows how (the OSCE) and Does (direct  
5 observation in clinical settings).<sup>30</sup> In order to assess at the “does” level, assessments have to be carried  
6 out in settings that mimic or are part of actual workplaces.<sup>31</sup> Types of assessments at this level include  
7 mini clinical evaluation exercises, mini professionalism evaluation exercises, direct observation, and  
8 multi-source feedback.<sup>31</sup> These together can potentially assess overall competency through  
9 documenting quantitative and qualitative longitudinal data in portfolios<sup>28</sup> and help evaluate  
10 “trustworthiness”<sup>31</sup> of the student to perform clinical behaviors in actual clinical settings. For effective  
11 pass-fail grading to occur, it is important to have assessments at the levels of this pyramid that can  
12 document a student’s progress and readiness for practice.

13 A second point to note is that having a good array of assessments to justify the use of pass-fail  
14 grading is not enough. Setting the appropriate passing score is very critical. There is no “gold standard”  
15 for setting the passing score(s). What the passing standards reflect must be clearly defined. A passing  
16 standard can be as high as needed depending on the purpose of the assessment and is not an absolute  
17 fixed point.<sup>25</sup> It is important to document all procedures used in setting the standard and also to ensure  
18 that it is defensible. Carefully designed rubrics are needed for grading and ongoing evaluation of the  
19 grading process is needed to monitor the grading process.<sup>4</sup> To enable that competency standards are  
20 interpreted judiciously, faculty must be trained and calibrated.<sup>32</sup> A pass fail grading system that is  
21 embedded in a mastery learning model, such as the Roseman School, is a good example of how the  
22 pedagogy and educational contexts need to be restructured to support the pass fail grading concept at a  
23 structural level by supporting active and experiential learning (<https://www.roseman.edu/about-roseman-university/six-point-mastery-learning-model/>). Setting the passing standards can occur at  
24 many levels: within the course, as a summative course grade, at the end of various developmental  
25 stages such as D1, D2, D3, D4. Finally, dental educators must consider pass fail standards with respect to  
26 the graduating students’ preparedness for practice.<sup>33</sup>

## 28 Challenges

29 While the reported instances of pass-fail curricula in dental and medical education have shown  
30 to have beneficial effects on student well-being and the culture of learning, there are barriers in dental

1 education. A pass fail grading may be perceived as less rigorous because students do not receive an  
2 actual grade that allows for comparison with other students. One often-discussed challenge to adopting  
3 the pass-fail system is its effect on evaluating residency applicants.<sup>34</sup> 80% of dental residency program  
4 directors have stated that they prefer a standardized, objective measure to differentiate applicants,<sup>35</sup>  
5 which may mean that graduates from pass-fail schools may be slightly disadvantaged if evaluated in this  
6 way for residency interviews. In a presentation at the American Dental Education Association's annual  
7 session, a group from the Harvard School of Dental Medicine presented survey findings from a  
8 nationwide survey of dental students, which found that 75% of students felt that a pass-fail curriculum  
9 would decrease their chances of matching into a specialty residency<sup>36</sup> even though no statistical  
10 difference between pass-fail curricula and graded curricula for residency placement and pass rate for  
11 board exams have been found.<sup>14</sup>

12 The culture in dental institutions can also pose challenges. Evidence has shown that faculty  
13 prefer traditional grades,<sup>2</sup> and dental students fear failure. Fox puts forth a coherent argument that  
14 today's dental students belong to a safety conscious generation that struggles to be independent, fears  
15 failure, believes grades to be a final outcome, and is reluctant to subsequent feedback.<sup>5</sup> Thus, both  
16 faculty and students can display a fixed mindset<sup>28</sup> that may not be supportive of the execution of pass-  
17 fail grading. The culture at dental institutions needs to support a growth mindset that promotes lifelong  
18 learning and resilience in the face of failure by taking the focus away from grades. Strong faculty  
19 development programs that assist faculty in developing effective grading practices as well as support  
20 pedagogy and assessment practices that foster mastery learning in dental students will help address the  
21 challenges to the adoption of a pass fail grading system.

## 22 CONCLUSION

23 A pass-fail grading system has the potential to encourage intrinsic motivation and foster  
24 mastery oriented learners. Pass-fail curricula may help dental educators more effectively realize their  
25 primary goal—to create healthcare professionals who are lifelong learners. However, there are  
26 challenges mainly from the lack of clarity in setting pass fail standards and the lack of conditions to  
27 foster growth mindset in students as well as faculty within the dental educational contexts. Both these  
28 challenges need to be addressed if pass fail standards are to be effective in promoting deeper learning.

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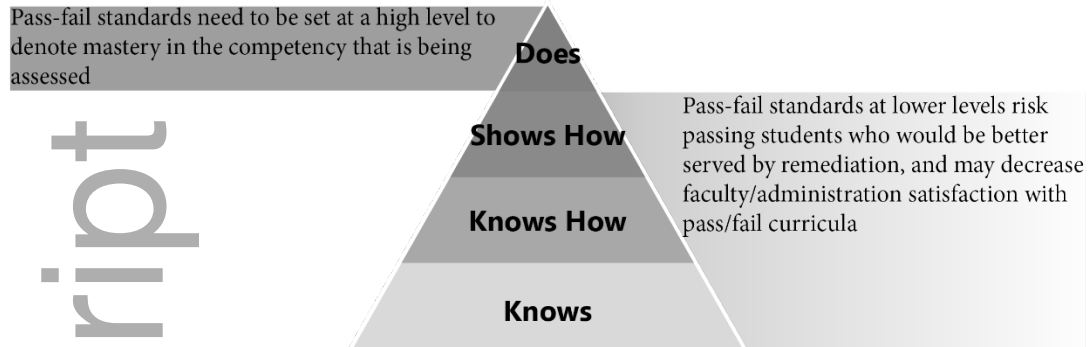


Figure 1. The Miller's Pyramid. Adapted from Miller GE. The assessment of clinical skills/competence/performance. Acad Med 1990; 65(9 Suppl):S63-7.

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