How People Learn: The Measurements of Students' Learning Process

Yunzhu Zhou[1,a,*]

[1]Shanghai Weiyu High School, Shanghai, 694620, China
a. hsxx120641@163.com
*corresponding author

Abstract: The grading system is a technique that can evaluate students' performances in school by entirely depending on marks. Unfortunately, it is not the best method to measure students' work. This paper analyzes this system that utilizes the knowledge from behaviorism and cognitivism in both internal and external aspects. Then we discuss three alternatives, including social practice, narrative feedback, and portfolio grading system. Social practice is a technique to evaluate grades by using knowledge in social experience, including doing research or writing papers. Narrative feedback is a type of comment in which teachers provides descriptive details on students' performances. The portfolio requires students to write research and paper including self-reflection and assignments that professors provide. Each method benefits in various fields. The work concludes that the combination of alternative and traditional assessment methods to evaluate students' process of learning is the best. It is important for educators to try different approaches and evaluate their effectiveness in supporting learning and growth.

Keywords: grading system, social practice, narrative feedback, portfolio grading system, evaluation of study

1.   Introduction

The grading system is a common technique used by different educational institutions. It evaluates the student's performance in schools based entirely on the marks. Generally, people use figures and letters to describe the grade of the students. There is no single and uniform grading system followed in the world. In UK, the grades are divided into 6 parts that included A, B, C, D, E, and F. The US grading system consists of letter grades that are provided to the students based on the percentage of score they get in the exams, such as A, A-, B+, B, B- and so on [1]. It indicates that the grading system is common around the world. The grading system was originated from Yale President Ezra Stiles in 1785. She divided students into classes based on four different grades in Latin: "optimi," "second optimi," "inferiores," and "pejores." In 1897, evidence of a letter grading system appeared. "The Mount Holyoke scale was an A–E system, with no letter F grade in place." In the early 20th century, American educational institutions widely used letter and number grading systems, but did not maintain a unified standardized system [2]. The grading system's purpose includes three aspects: an evaluation of student's work, a method to encourage students to pursue higher achievement and a reflection to students' future prospects.

Behaviorism "views learning as a cause and effect mechanism, in which external factors lead to a response, and over time, this response becomes a learned behavior" [3]. The grading system provides external motivation that gives students extrinsic rewards. Moreover, the grading system has relied on the principles of operant conditioning. When teachers use a grading system to measure students' learning process, it is usually considered positive reinforcement because it gives clear feedback from teachers that will reinforce the tendency to continue the behaviors in the future. On the other hand, it can be considered as punishment and negative reinforcement. The students who receive poor grades may be likely to face penalties. The punishment for poor grades may create a cycle of negative reinforcement.

In this paper, I will analyze the grading system through the lens of behaviorism and cognitivism. Then, I will select some alternatives to the grading system, including portfolio grading, competency-based grading and narrative feedback rather than letter or number grades.

2.   Evaluation for Grading System

2.1.   Analyzing Grading System by Using Two Learning Theory as Lens

The grading system is an application of behaviorism theories. B.F. Skinner was a prominent behaviorist who believed that learning can be shaped and controlled through environmental factors and consequences. The grading system can give students both positive and negative reinforcement, which is consistent with Skinner's theory [4]. The behaviorist, Schwartzetal, D.L. stated, "A reward is a desirable outcome received in response to behavior. People will repeat a behavior that leads to a desirable effect." Students can get both rewards and punishment in the process of learning by using a grading system. The reward that students get from the extrinsic and intrinsic parts can have positive reinforcement to their motivation. The punishment can have negative reinforcement to students' learning. "The motivation is a condition that activates and sustains behavior toward a goal" [5].

First of all, "Extrinsic rewards are not integral to a behavior and come after completion" [6]. In the process of study, extrinsic rewards include encouragement from teachers, such as giving some snacks to praise the students who got excellent grades. Grades record students' learning outcomes and make learning more effective. The analysis after examination is one of the commonly used teaching methods for teachers. It is generally believed that the publication of the average score of the test and the highest and lowest scores is conducive to students' self-positioning, helping students to understand their own merits or deficiencies in comparison with their classmates, so as to enhance their study efficiency or motivate them to study hard. This method stimulates students' interest in learning and arouses their enthusiasm to participate in learning, enables students with learning difficulties to experience the joy of success and enhances their confidence in learning. Thus, if students continue to motivate by teachers' rewards, they will develop good habit to motivate them to study. It shows that students can get positive reinforcement through extrinsic rewards by using a grading system.

Furthermore, the impact of grades on students' intrinsic motivation has been extensively studied in educational psychology. "Intrinsic rewards are integral to an activity and self-reinforcing" [6]. Intrinsic rewards include students' interests, and curiosity for knowledge. The high grades show that students have the ability to achieve success. Therefore, it gives students positive feedback, improving their confidence to surpass others. In the long run, intrinsic motivation will establish a solid development of study and steady improvement of grades. As a result, it provides positive reinforcement in the students' learning process.

In addition, the potential effect of grades on the punishment is that it may create a cycle of negative reinforcement, where students who are punished for poor grades and more discouraged and

less motivated to improve, which leads to further poor grades and more punishment. In the interview for some high school students, some students shared: 'Since I did not do well in the exam and my grades went down too bad. It makes me feel stressed and frustrated. I've been working hard for a long time, but unfortunately, it's hard to climb back up the ladder if it goes down.' Another student said that it is hard to improve grade, but easy to lower it. It indicates that students are facing a huge pressure to the grading system, which causes depression and anxiety [7].

Behaviorism thus understands the relationship between motivation and rewards and punishments as being directly linked. Positive reinforcement is used to encourage desired behaviors and increase motivation, while negative reinforcement is used to discourage undesired behaviors and decrease motivation.

The grading system is also an application of cognitivism. "Cognitive learning is an active style of learning that focuses on helping you learn how to maximize your brain's potential" [8]. The grading system provides feedback to students which directly reflects the problems in students' learning process. Students can understand unfamiliar knowledge and improve their ability to solve problems. It indicates that students use their brain to construct knowledge by forming connections between unfamiliar knowledge and already known knowledge. It is consistent to the cognitive view because "cognitivism makes learning easier for people to relate new information to existing ideas, which deepens your memory and ability to remember" [8]. Moreover, the grading system is related to metacognition. Metacognition is the practice of being aware of one's own thinking [9]. "Metacognitive knowledge is that segment of your stored world knowledge that has to do with people as cognitive creatures and with their diverse cognitive tasks, goals, actions and experiences" [10]. When teachers use a grading system to record students' studying process, they usually ask students to write a self-reflection after receiving a graded assignment or test. It helps students to apply metacognitive experience which activates strategies aimed at either of two types of goals — cognitive or metacognitive.

2.2. Problematizing the Learning Theory Embedded in Grading System

While the behaviorist perspective provides various insights into how motivation works in grading system, it does not offer a complete picture of how motivation works. The following perspectives illustrate this problem.

Firstly, there are other factors that influence the motivation of students. The grades may not be the only motivating factor. Some students are motivated by personal goals. "The autonomy refers to having a choice in one's own individual behaviors and feeling that those behaviors stem from individual volition rather than from external pressure or control" [11]. These students have a clear purpose of studying so this positive reinforcement is not included in behaviorism. Some students are also motivated by interests or passion for some specific subjects. This strong personal support for intrinsic motivation is excluded in behaviorism. Intrinsic motivation is the most self-determined type of motivation and occurs when a person performs an action spontaneously out of genuine interest or enjoyment [11].

Moreover, the individual differences will affect the motivation of students. The behaviorist perspective assumes that all learners respond to reinforcement and punishment in the same way. However, the learning styles are variations among different students. They may impact how students absorb information and comprehend how to apply in the practice of learning. Also, the cognitive abilities are distinctive. Every students have different ways of thinking and understanding. As a result, they will change the ways to motivate students to learn.

On the other hand, the relationship between grades, self-efficacy and mindset is often more complicated than we might think. The grades may influence a learner's self-efficacy and mindset in unexpected ways that might actually decrease their motivation to learn.

For one thing, the learners will have a fear of failure after using a grading system to measure their learning ability. When students are too focused on achieving high grades, they will become anxious and be afraid of failure so the fear of failure will narrow the focus of students on only grades instead of happiness in the learning process. It will decrease the interest of study and lower the study motivation. When learners face the high pressure of grading, they will make a proportional relationship between their self-worth and their academic performance. It will cause negative hopelessness, which can decrease their motivation to study. It demonstrates the instability of achievement.

For another, the grading system will overemphasize the comparison. Some students will feel a huge gap between well-performed learners and themselves. It leads to competition instead of collaboration, which will frustrate students and increase disputes between students. Some students who achieve low grades will be jealous to the students who achieve higher grades. As a result, this sense of competition will decrease overall enjoyment of the subject.

3.   Presenting Research on Alternatives to Grading System

Nowadays, students have pressure due to their grades. Many problems remain regarding the impact of the grading system on academic motivation, which is presented in the paper. As a result, institutions should reappraise the necessity of such an evaluation, given that grades may negatively influence basic psychological needs and academic motivation. To some extent, grades do not increase motivation. Instead, grades can cause anxiety. Here is a question, "Are there any alternative approaches to measure students' learning process instead of the grading system?" As educators and researchers increasingly recognize the limitations and negative impacts on traditional grading systems, several alternative approaches to assessment have emerged. Assessing students' learning ability through fieldwork can support basic psychological needs and enhance motivation, promote trust between teachers and students and cooperation between students. Deborah L. Butler and Philip H. Winne suggest that narrative feedback, which provides learners with detailed evaluation and descriptive comments, can be an alternative to grading systems [12]. Kathleen Jones who conducts workshops and writes extensively to continue to explore makes sense of alternative grading practices— portfolio grading system [13]. It allows students to draft and revise the paper for many times before submitting it for assessment. Using knowledge in social practice to determine a grade can be a valuable and effective assessment method, as it allows students to demonstrate their understanding of course material in a real-world context. These alternative approaches to the grading system are a few examples of many assessment methods.

3.1.   Social Practice —— A Method to Evaluate Grades Through Using Knowledge in Social Experience Including Doing Research or Writing Paper

First of all, using knowledge in social practice to determine a grade can be a valuable and effective assessment method, as it provides students an opportunity to use knowledge in real life. From the perspective of social practice theory, the direction of learning is not chosen in isolation, but is linked to existing social structures [14]. To use knowledge in social experience, the students have to grasp the application of knowledge. Therefore, it improves the comprehensive skills of students. As Dreier [15] writes, "People must take into account the structuring of social practice into particular contexts with particular links and use those links in directing their trajectories [pathways] across them".

Some theorists may dispute that measuring grades using social practice can negatively influence students and their learning outcomes. It is not an appropriate way to measure the student's learning process by social practice. Social practice is subjective and can vary widely depending on the

evaluated activity or project. This can make it difficult to maintain consistency in grading, which can lead to inaccurate evaluations of student performance. Social practice can be biased towards students who have better access to certain resources or who are more sociable. This can result in disparities in grades that are not reflective of a student's actual academic ability. Moreover, the social practice may have a disconnection from course material: If social practice is given too much weight in grading, students may prioritize participation in social activities over studying course material. This can lead to a disconnection between what is being taught in the classroom and what students are actually learning.

However, these problems can be solved in the following aspects. First , the teachers can select various social practices relevant to the current study to make an effective assessment. For example, if the course is on environmental science, a student's participation in a community garden could be a relevant social practice to evaluate their knowledge in the subject area. Secondly, the assessment can be consistent across all students by providing students with specific criteria. This ensures that all students have equal participation opportunities and are evaluated based on the same standards. Thirdly, using a random assignment method to allocate social practice opportunities to students can avoid unfair divisions. This indicates that all students have an equal chance of participating in social practice, reducing the likelihood of bias or favoritism. In addition, teachers can maintain transparency in the social practice process by providing students with information about the selection process, criteria, and evaluation results. This helps to build trust and confidence in the process and reduces the likelihood of complaints or disputes. Furthermore, teachers can create a supportive environment for social practice activities where students feel comfortable and safe to participate. This includes providing appropriate resources, mentors, and support systems for students.

In conclusion, social practice offers a valuable approach for measuring students' study processes. By engaging in community service, internships and collaborative projects, students can gain practical experience and develop important skills that will help them succeed in their future careers. It is important to incorporate social practice into the curriculum to ensure that students are fully prepared for the challenges that lie ahead.

3.2. Narrative Feedback

Narrative feedback is a type of comment in which teachers provides descriptive details on students' performances instead of simply providing figures and grades. It is more comprehensive and overall to measure a student's learning process. The research found that narrative feedback can increase engagement and improve self-efficacy since it supports deeper learning [12]. There are a lot of benefits by using narrative feedback to record the study process.

First of all, it is more personalized. The narrative feedback may include a particular example of strength and an area for improvement. Since teachers have to specifically consider individual needs and abilities, the narrative feedback is effective and has a strong focus to each student. It helps the students directly feel more connected to the feedback. Also, it allows the teachers to provide their own perspectives on the evaluation of students so that it has a large extent of subjectivity. On the other hand, these subjective opinions can better fit on particular students based on how well the teacher knows the students.

Moreover, narrative feedback can motivate students more. It provides a deep understanding and background of a student, which can help students become more interested in their learning. Since it is often clearer and more specific, the students can understand the areas they need to focus on and improve easily. "For all self-regulated activities, feedback is an inherent catalyst" [12]. The feedback describes the nature of the learning process and points out the outcomes. According to the most recent research, Bangert Drowns et al. concluded that feedback is effective when it "empowers

active learners with strategically useful information, thus supporting self-regulation" [16]. It shows that feedback can give full resources to active learners, which will guide their construction of knowledge.

In addition, narrative feedback can provide students with comprehensive information. One study published by the Journal of Educational Psychology found that when students complete writing assignments, some students who accept narrative feedback receive higher levels of improvement than those who receive scores or grades only. It implies that narrative feedback is far more effective in providing some typical examples of strengths and weaknesses to improve operative instructions to students.

Furthermore, it can motivate the relationship between professors and students. By providing some detailed information based on professors' own perspectives, it can establish a more effective instructive relationship. Students can understand their problems and improvements that the professor suggests directly. As a result, it promotes effective communication between teachers and students. A study published in the Journal of Management Education examined the role of narrative feedback in fostering mentoring relationships between business school professors and students.

In conclusion, narrative feedback can be a powerful tool to promote growth and development, increase students' motivation to study and improve the relationship between professors and students. By providing specific and personalized feedback, students can reflect on their behaviors better and make meaningful changes to improve their performance.

3.3. Portfolio Grading System

The portfolio grading system is an alternative to the traditional grading system. It requires students to write research and paper, including self-reflection and professors' assignments. According to Arter and Spandel [17], a portfolio is a deliberate collection of a student's work that is intended to demonstrate to the student's efforts and accomplishments. According to Paulson, Paulson and Mayer, a portfolio is a purposeful collection of a student's work that demonstrates the student's efforts, progress and achievements [18]. There are a lot of advantages for educators to use a portfolio grading system.

Firstly, it encourages students to reflect in the process of learning. Since the portfolio grading system provides a long-term evaluation through the learning process, students can adjust their study methods by receiving teachers' feedback at different periods. It provides multiple opportunities for assessment, which includes students' own learning and growth. As a result, it allows students to demonstrate their strengths and weaknesses [19].

Moreover, it improves students' engagement and motivation in a writing course. In the journal "Portfolio Assessment as an Alternative to grading student writing," written by Kathleen Jones, she thinks that if students are given a chance to explore their tasks, this responsibility will relate to their purpose of learning and achievement [13]. As a result, it is consistent with students' wants and interests. This encourages students to better understand knowledge in the learning process and improves engagement because of the effectiveness of link to study interests. It gives students more control over their own grading and forces students to become critics of their own papers.

In addition, it encourages communication between teachers and students. Both students and teachers participate in evaluating the study process. The use of portfolios forces students to write many drafts of their papers, receive feedback at many points, and choose which papers they want to be graded. As a result, it adds the participation of students in the evaluation process. The process is not a one-time but as lasting one.

Overall, portfolio assessment is a useful tool to promote student engagement, motivation, and self-reflection. It also enhances the communication between teachers and students. Therefore, it can apply in different educational institutions around the world.

4. Conclusion

The grading system is a measurement to evaluate students' performances based on the marks only. Many universities use grading systems to determine curriculum performance and qualifications for academic recognition, as well as to determine whether students will be admitted or not to college. There are both positive effects and negative effects on using grades to measure a student's study process. Traditional assessments primarily focus on academic knowledge and skills. It give students motivation to study, but may lead to discouragement. It lets learners and educators know how students perform in their respective subjects and learning areas so that both can excavate weaknesses and achieve good results. On the other hand, it increases competition which causes negative reinforcement. The punishment for poor grades may create a cycle of negative reinforcement. Fortunately, there are other alternatives to the grading system, including social practice, narrative feedback and portfolio grading system. Social practice is a theory within psychology that emphasizes activity and inquiry. Narrative feedback is a holistic form of feedback that includes detailed comments. The portfolio grading system records students' papers and assignments and shows the students' self-reflection. All three alternatives encourage students to reflect in their participation and enable efficient instructor feedback. Compared to the traditional grading system, these alternatives are long-lasting projects and provide more comprehensive understanding in students' learning process. The grades and scores are sometimes narrowed to show students' work. To balance evaluating students' studies, the most effective approach will depend on the setting, subject matter, and learners involved. I suggest that we combine alternative and traditional assessment methods to evaluate students' learning processes. There are several advantages of combining alternative and traditional assessment methods. Firstly, it can have a more holistic evaluation, which includes critical thinking, self-reflection, skills and knowledge. By combing alternative and traditional assessment methods, teachers can gain a more comprehensive view of students' learning process. Moreover, it can provide more flexibility than only a traditional grading system. Different subjects have various characteristics: mathematics is more inclined to theoretical knowledge, business is more oriented towards real-world applications, etc. This combination of approaches can better match subjects' learning styles and uniquely demonstrate students' understanding. Therefore, it is important for educators to try different approaches and evaluate their effectiveness in supporting learning and growth.

References

[1] VibeThemes. (2020, September 9). Grading systems from around the world: Go assignment help blog. GoAssignmentHelp Blog | Assignment Solution. Retrieved April 14, 2023, from https://www.goassignmenthelp.com/blog/grading-systems-from-around-the-world/#:~:text=Grading%20Systems %20From%20Around%20The%20World%201%201.,Netherlands%20...%206%206.%20Grading%20System%20 in%20Canada.

[2] Leicht, A. (2021, December 7). History of the letter grading system. Stacker. Retrieved April 14, 2023, from https://stacker.com/education/history-letter-grading-system

[3] Duchesne, S., McMaugh, A., Bochner, S., & Krause, K. L. (2013). Educational psychology: For learning and teaching (4th ed.). South Melbourne, VIC: Cengage Learning.

[4] Skinner, B. F. (n.d.). The Science of Learning and the art of teaching. Cumulative Record (Enlarged Ed.)., 145–157. https://doi.org/10.1037/11324-010

[5] The National Academies Press. (2018). How people learn. learners, contexts, and cultures.

[6] Schwartz, D. L., Tsang, J. M., & Blair, K. P. (2016). R is for reward: Motivating behavior. In The ABCs of how we learn: 26 scientifically proven approaches, how they work, and when to use them (pp. 220–233). essay, W.W. Norton & Company, Inc.

[7] Joe, F. (2020, September 1). Taking the stress out of grading. ASCD. Retrieved April 14, 2023, from https://www.ascd.org/el/articles/taking-the-stress-out-of-grading

[8]   Valamis. (2023, March 21). Cognitive learning theory: Benefits, strategies and examples. Valamis. Retrieved April   14,   2023,   from https://www.valamis.com/hub/cognitive-learning?_gl=1%2Ardchfi%2A_up%2AMQ..%2A_ga%2AMTc0MzAzNzI yMy4xNjgxMzEzNjU5%2A_ga_WH32P1Y0T3%2AMTY4MTMxMzY1OC4xLjAuMTY4MTMxMzY1OC4wLjAuMA.. #what-is-cognitive-learning

[9]   Marilyn, P.-M. Ph. D. (2020, October). What is metacognition? how does it help us think? https://www.psychologytoday.com/us/blog/the-moment-youth/202010/what-is-metacognition-how-does-it-help-us- think#:~:text=Metacognition%20is%20the%20practice%20of%20being%20aware%20of,yourself%2C%20%E2 %80%9CI%E2%80%99m%20not%20sure%20what%20I%20just%20read.%E2%80%9D

[10]   Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. American Psychologist, 34(10), 906–911. https://doi.org/10.1037/0003-066x.34.10.906

[11]   Mcdaniel, R. (1970, June 10). Motivating students. Vanderbilt University. Retrieved April 14, 2023, from https://cft.vanderbilt.edu/guides-sub-pages/motivating-students/#self

[12]   Butler, D. L., & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. Review of Educational Research, 65(3), 245–281. https://doi.org/10.3102/00346543065003245

[13]   Tchudi, S., & Kathleen, J. (1997). 18. In Alternatives to grading student writing (pp. 255–263). essay, National Council of Teachers of English.

[14]   Penuel, W. R., Van Horne, K., DiGiacomo, D., & Kirshner, B. (2017). A social practice theory of learning and   becoming   across   contexts   and   time.   Front   Learning   Research,   4(4),   30–38. https://doi.org/10.14786/flr.v4i4.205

[15]   Dreier, O. (2008). Psychotherapy in everyday life. New York: Cambridge University Press.

[16]   Bangert-Drowns, R. L., Kulik, C.-L. C., Kulik, J. A., & Morgan, M. T. (1991). The instructional effect of feedback   in   test-like   events.   Review   of   Educational   Research,   61(2),   213–238. https://doi.org/10.3102/00346543061002213

[17]   Arter, J.A. & Spandel, V. (1992). Using Portfolios of Student Work in Instruction and Assessment. Educational Measurement: Issue and Practice, 11(1), 36-44.

[18]   Paulson, F.L, Paulsun, P. & Meyer (1991). What Makes a Portfolio?. Educational Leadership, 48, 60-63.

[19]   De Fina, A. (1992). Portfolio Assessment: Getting Started. New York: Scholastic Professional Books