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Reducing the Impact of Bias in Oral Assessments

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Abstract—Oral assessment is an important method to evaluate the learning outcomes of scientific courses. However, there are certain limitations when oral assessment is applied. One of these limitations, which is not apparent in anonymous written exams, is the existence of biases which could lead to unfair (positive or negative) outcomes of the assessment. This could lead to decreased motivation and sense of belonging among minority student groups, potentially upholding or even increasing inequalities. The major issue with biases is that most of them are unconscious, meaning that it is very tough to mitigate. In this manuscript, we analyze the emergence and effect of expectancy-based bias through personal construct theory in order to find approaches to reduce the influence of bias in oral assessment. As such, we address biases existing before interaction with the student (stereotype), emerging from interaction with the student (halo bias), and how these can contribute to a biased idea of the student in the evaluator's mind. We finally discuss how this can cause cognitive dissonance and biased assessment when student performance is not in line with the teacher's cognitive model of the student and propose solutions on how to deal with this to minimize bias in oral assessment.

Index Terms—Bias, Oral Assessment, Personal Construct Theory

I. INTRODUCTION

EXAMINATIONS are an important tool to evaluate the performance of students. There exist several types of examination strategies. One of the most widely used, especially in small courses, is oral assessment since it has many advantages. Theobald et al. [1] states that “*Compared to their written counterpart, oral assessments provide a wealth of information about student understanding. Instead of deciphering a static response, oral assessments provide instructors the opportunity to probe student explanations, obtaining a more complete picture of their understanding.*” Additionally, they argue that oral exams are more resistant to plagiarism, as students must formulate their own answers. Furthermore, Wiggins and McTighe [2] state that “*Asking students to explain concepts ties together four of the six facets of understanding — explanation, interpretation, application, and perspective.*” However, one major disadvantage of oral assessment is the occurrence of biases [3].

Bias can be defined as the action of supporting or opposing a particular person or thing in an unfair way, allowing

personal opinions to influence the judgment. Biases can be innate or learned. People may develop biases for or against an individual, a group, or a belief [4]. The two main types of bias are *conscious* and *unconscious* bias. Conscious bias, also known as explicit bias, mean that individuals are aware of their biases and act intentionally based on them. This type of bias involves explicit beliefs, attitudes, and behaviors, often characterized by discrimination and malicious intent towards specific individuals or groups. Unconscious bias, also known as implicit bias, refers to biases that operate outside of a person's awareness and control, often in contrast to their conscious beliefs and values. These biases are difficult to identify but can significantly influence actions and behaviors without malicious intent, as individuals may be unaware of their biases and their impact. [5]

There are different studies investigating the impact of biases in oral assessment. Ferguson [6] made a study evaluating the effect of introductions for oral presentation. It was shown that gender biases were reduced when the candidates were introduced as doctors/experts instead of as students. In their study, the gender of the evaluator had no effect. Winke [7] investigated the (language) accent in oral examination and found out that the examinee got more favorable ratings if the assessor knew (as a second language) the native language of the presenter. One, however, needs to be aware that biases in assessment can be difficult to study in real settings as the awareness of the study often alters people's behavior. Consequently, there is a plethora of studies that both confirm and challenge the effect of bias [8]. Nevertheless, when meta-analyses of studies have been conducted, they have confirmed the effect of bias in assessments [9]. Some of the most studied biases relevant to oral assessments are the expectancy-based biases stereotype bias and halo bias [10]. Expectancy bias means that the teacher's preconception of a student will influence his or her evaluation of the student's performance. In the case of stereotype bias, it is stereotypical ideas of people belonging to a certain group, often learned from society and media, that cause either positive or negative bias. In the case of halo bias, it is a teacher's previous experience with a student, either good or bad, that form certain expectations that can influence the evaluation of student performance. A previous experience with a student performing well can cause a positive bias when evaluating future performances and vice versa.

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These expectancy-based biases can be understood through constructivist psychological theories that are applied to learning. According to Kelly's 'personal construct theory', we all make up models in our minds of how the world works and how to understand it, and new pieces of information either confirm our models or force us to reconstruct them [11]. This is a form of epistemological constructivism that subscribes to the idea of an external reality that we understand through our cognitive construction of it [12]. In constructivism, new information that aligns with our existing model of reality is added to the model through assimilation whereas new information that conflicts with our existing model can force us into accommodating our model [13].

In line with personal construct theory, teachers will have their own idea of how a student will perform which generates certain expectations, indifferent from the type of bias at play. When we are faced with information that contrasts our models, we first experience cognitive dissonance [14]. This would be the case if a student performs better or worse than the teacher had expected. According to Festinger's theory of cognitive dissonance, people will want to minimize the internal dissonance which can be done in two ways: either by accommodating their own models of reality, or by re-evaluating the new piece of information so that it fits the model, perhaps even discarding it as false [15]. In the case of an oral assessment, this would mean that a student performance that conflicts with the teacher's idea of the student would either force the teacher to re-assess their idea of the student to match the performance, or re-evaluate the performance to match the pre-conceived idea of the student. The latter would thus imply that the grading does not match the performance but rather the teacher's prejudice of the student, and that the grading is biased. It has been suggested that a biased assessment is the more likely outcome, as *"once an evaluative impression of a person is formed, it is the person's behavior that is interpreted in terms of that impression and evidence which does not support that impression is discounted."* [16]

II. SPECIFIC CASE & ANALYSIS

A. Conceived Case

A 24-year-old female student is presenting her master's thesis in computer science. Her thesis supervisor, a 28-year-old man, is also present as well as around 20 people in the crowd, mainly friends, family, and classmates. She is being assessed by a 55-year-old female professor who has had experience with the student in a previous course where she made a relatively poor performance. However, she has worked hard for her master's thesis and her thesis supervisor has been very impressed by her performance and she executes the presentation flawlessly. Yet, the evaluating professor appears highly critical of the student's work and asks questions that suggest disbelief in the student's ability to have done what she is describing in the presentation. The tone of the professor is harsh, clearly making the student as well as the others present in the room uncomfortable. Evidently, the student's performance in the oral assessment and the professor's interpretation and evaluation of the performance do not align, indicating that the professor could be biased.

B. Case Analysis

In the described situation, there are likely to be several biases at play causing the disproportionately negative reaction from the professor. First, it can be expected that there was some stereotype bias present in the first encounter between the professor and the student, i.e., assumptions about the student based on the professor's preconceived notions associated about gender, race, ethnicity, or other characteristics. The gender stereotype here might be that female students generally perform worse than male students in computer science. Even though the professor is also female, this argument unfortunately holds since stereotype biases are inherent in any human, regardless of their own gender or other characteristics [17]. Further, we propose that halo bias, meaning that people are judged by their past performance even if the current or future situation has nothing to do with it, also plays a big role in the described situation [10]. The somewhat weak performance of the student in the previous course with the professor will lead to the professor actively seeking weaknesses in the current performance. This acts as a form of confirmation bias, which is the tendency to seek, interpret, and remember information in a way that confirms one's preexisting beliefs or hypotheses. Hence, based on the preexisting belief of the professor that the student is bad due to a bad performance, the current evaluation is interpreted in a negative way.

In accordance with personal construct theory, and most other constructivist theories, people's understanding of the world, subjects, and other people are formed by experiences that generate models in our minds. In the described situation, the professor's first model of the student will most likely be based on existing preconceptions, i.e., stereotypes. As we established that the professor is likely to have had a negative bias towards female students, the initial model of the student would be that she performs below average, thus generating relatively low expectations. This model was then confirmed by the professor's first interaction with the student in the course where she performed poorly, thus establishing the initial model more firmly through assimilation of the new experience. The two forms of expectancy-based biases - stereotype bias and halo bias - work together to generate low expectations on the student. However, in the master's thesis presentation, the student's performance conflicts with the model the professor has constructed and thus her expectations of the student. This causes cognitive dissonance in the professor as the new experience cannot be assimilated into the existing model. Thus, the professor's model must either be accommodated to fit the new experience, or the new experience of the impressive performance must be re-evaluated to fit the existing model. What is witnessed during the presentation appears to be the professor's attempts to re-evaluate the student's performance by questioning and dismantling her work in a search for flaws that would make the performance align with the professor's model. Potentially it is the cognitive dissonance and the inner conflict it causes that make the professor act in a distraught manner in her attempt to make sense of the situation. If the professor were to grade the student based on this re-evaluated performance, i.e., in accordance with her previous beliefs and expectations of the student, the grading would be biased. However, the professor's behavior could also be caused by the rather

distressing process of accommodating her model, as accommodation tends to bring about a sense of unbalance before cognitive conceptions have been successfully reconstructed [13]. If the professor despite her actions would give the student a high grade after the presentation, her behavior during the presentation would have been caused by bias, but the final grading would however not be biased.

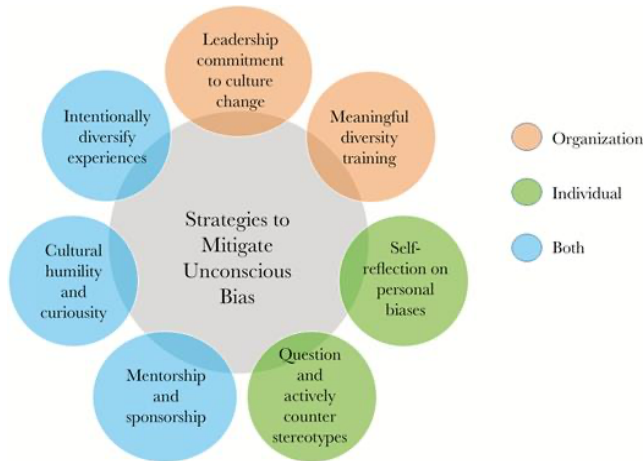


Figure 1: Strategies to mitigate unconscious bias [18].

III. PROPOSED SOLUTIONS

Given that the described biases at play are in the category of unconscious biases it is hard to overcome them. Anyhow, there are ways to mitigate unconscious biases. First, it is very important to be aware that biases exist and to accept that everybody has biases. In a second step self-reflection will help to get an idea of which biases exist in our heads and maybe find out how they were developed. For this second step, the help of a critical friend is indispensable, because many biases are more easily detectable for a neutral spectator. Third, there needs to be the willingness to challenge the deeply ingrained assumptions in us. Workshops or other organized events can help to identify our potential personal biases and discuss the effects of biases in general and in specific situations [19]. An overview of mitigation strategy can be found in figure 1 [18]. As introduced in the case analysis, in the specific situation are different biases at play. Hence, in the following part, we intend to give more specific solutions that apply to the very specific case we created.

To mitigate **stereotype biases** in upcoming future oral assessments in computer science it would be good to have a more diverse environment. This means that students with different genders and different race, ethnicity, or other characteristics will be represented in the same amount. Because the more diverse our educational contexts become, the more stereotypes will be dismantled. Furthermore, in such a situation as described it would be good, if one of the other attendees would have intervened, when they have observed the stereotype-biased behavior. Otherwise, critical discussion in general as well as to be open for feedback could also improve the oral assessment situation regarding stereotype biases.

Since in our case the **halo-bias** was very distinct it would be beneficial to have an examiner who has no previous experience with the student. However, this examiner would not be as familiar with the project as more involved examiners could be, which could also have a negative effect

on the oral assessment situation. Moreover, biases based on the initial impression of the student such as stereotyping would still hold. These biases can only be overcome by training. Hence, it would be necessary to introduce mandatory workshops for personal that can grade students to take workshops that aim at mitigating unconscious biases. Further, we propose to have some neutral person on the evaluation committee that is only responsible for the detection of biases to take this into account when grading.

More general approaches to mitigate bias include establish very clear evaluation criteria, as this gives the teacher an external systematic framework to relate to which makes the assessment less subjective [20]. Using these specific criteria, cognitive dissonance can be overcome more easily leading to a faster accommodation of the teacher's internal model. The proposed workshops should therefore include training on the definition of clear objectives as well as an intention to synchronize these guidelines in between the PIs such that the same evaluation criteria are used throughout the university (or even across various universities).

IV. CONCLUSION

In this manuscript, relevant biases in oral assessment are analyzed and mitigation strategies discussed. Oral exam settings expose students to potential bias from evaluators which cannot be avoided through anonymity, which in turn can impact the planning, performance, and evaluation of the student. We used two biases, stereotype and halo bias, to analyze a conceived case study. We concluded that the evaluating professor experiences biases during the exam which created a cognitive dissonance in the professor as the student performance did not match the professor's expectations. In the final evaluation step the professor needs to handle this dissonance and the choice she makes will decide if grading, despite biased behavior during the presentation, will be biased.

Recognizing that everyone has biases, we conclude that to reduce the influence of biases during evaluation and grading three actions are important. Firstly, the evaluators, (and teachers and students) need better knowledge about biases and to be aware of their own biases. This is necessary to move the bias from the unconscious to the conscious, and thus to be able to counteract these cognitive traps. Secondly, clear guidelines, general criteria, and scoring scales for evaluation can help recognize and reduce bias by offering a point of reference external to the evaluator, thus making the grading less subjective and more objective. Thirdly, and in a greater perspective, it is important to keep working for diverse and inclusive environments in higher education as representation in the long run will reduce stereotype bias.

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