Improving Fairness and Quality in Master's Thesis Assessment in Norwegian Higher Education

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Abstract. Assessment of master's theses is a pivotal aspect of higher education, significantly influencing students' academic success and future career opportunities. In Norway, discussions on fairness, objectivity, and the integrity of thesis evaluations have highlighted challenges in ensuring impartial assessment practices, especially as universities are legally mandated to maintain transparency and impartiality. This paper examines factors that may affect the objectivity of thesis evaluations in the Norwegian context, drawing on research and case studies to highlight challenges and propose solutions. Addressing these issues is essential for upholding the credibility and fairness of higher education. By implementing strategies such as standardized assessment criteria, comprehensive examiner training, public defenses, and technology-driven approaches, Norwegian universities have the potential to set a global standard for equitable thesis evaluations. The insights and recommendations presented aim to guide policymakers, educators, and academic institutions in enhancing assessment practices to ensure fairer outcomes for all students.

Keywords: Bias · Academic Evaluation · Master's Thesis · Transparency · Computer Science

1 Introduction

The assessment of master's theses is a fundamental aspect of higher education with significant implications for students' academic and career prospects. In the Norwegian university context, recent concerns about biases in this process have highlighted the need for a thorough review and reform of current practices [10, 7, 11, 9, 8].

Bias in academic assessment can take many forms, including gender, ethnic, prestige, and cultural biases [22, 3, 12, 4]. These biases have the potential to influence thesis evaluations, which may affect the perceived fairness and objectivity of student assessments. For instance, gender bias may result in female

students receiving lower grades than male peers for equivalent work, while ethnic bias can disadvantage students from minority backgrounds [1, 21].

Fair thesis assessment is crucial as outcomes often influence students' personal confidence, access to scholarships, job placements, or admission to doctoral programs. Favoritism toward students from prestigious institutions, for example, may create an advantage based on academic background rather than individual merit [5]. Such examples underscore the need for fair and unbiased assessment practices.

The integrity of the higher education system depends on the perception of fairness in its assessments. Ensuring students are evaluated based on the quality of their work rather than factors such as gender, ethnicity, or institutional affiliation is essential for maintaining trust in academic institutions [13]. By addressing these biases, universities can foster a more equitable environment that promotes diversity and inclusion.

In this paper, we review the types and sources of bias in thesis assessment, examine current practices and challenges in Norwegian universities, propose solutions to reduce bias, and discuss the broader implications of these solutions for higher education, particularly within the field of Computer Science.

2 Related Work

Bias in academic assessment has been widely studied across various educational contexts. Gender bias, for instance, has been documented in multiple settings, including recruitment and assessment [1, 4]. Studies indicate that female students often receive lower grades than male peers for similar work, impacting their academic and professional opportunities. Gender bias can also lead to long-term disparities in career advancement and salary, with women underrepresented in senior academic and professional positions [1].

Similarly, ethnic bias is a significant issue, as students from minority backgrounds often receive lower grades than majority peers [21, 22]. This type of bias reduces diversity in higher education and the professional fields that follow, as students from minority backgrounds may feel undervalued in academic assessments, which can discourage their participation in higher education and limit professional opportunities [23].

Prestige bias also presents challenges to fair assessment. Research shows that students from prestigious institutions often receive more favorable evaluations than those from lesser-known schools, even when the quality of work is comparable [5]. This perpetuates inequality and limits opportunities for students from less privileged backgrounds. De Cruz [5] demonstrated that institutional prestige can skew examiners' perceptions of quality, resulting in biased assessments.

Recent studies have focused on identifying the root causes of these biases and developing interventions to address them. For instance, double-blind assessment, where the student's identity is hidden, has shown promise in reducing bias [13].

Malouff et al. [13] found that double-blind assessments can significantly reduce gender and ethnic biases, leading to more equitable outcomes.

Other studies suggest implementing standardized assessment criteria and examiner training to counteract biases [17]. These interventions can help ensure students are assessed fairly based on the quality of their work, rather than on external factors. Training programs focused on cultural competency and implicit bias can significantly improve the fairness of academic assessments.

Additionally, the use of technology in assessment has been explored to reduce bias. Automated grading systems and plagiarism detection software offer objective measures of student performance, which can supplement traditional assessment methods and help minimize examiner bias [16]. AI-driven systems, for instance, can standardize grading, reduce subjective biases, and make the assessment process more transparent and equitable [18].

Further research is needed to understand the effectiveness of these interventions in different educational contexts. Additionally, studies on the intersectionality of biases, such as how gender and ethnic biases may combine to affect student outcomes, are necessary. Understanding these dynamics is essential for developing comprehensive strategies to address bias in thesis assessment.

Although we could not find any systematic study of potential bias in the assessment of master's theses in Norway, this topic has been discussed in various contexts in several newspaper articles [10, 7, 11, 9, 8].

3 Dimensions of Bias in Thesis Assessment

Bias in thesis assessment can manifest in various dimensions. These include, but are not limited to:

3.1 Gender Bias

Gender bias can affect the evaluation of theses, with some studies indicating that female students may receive lower grades than their male counterparts for similar work. This bias may stem from stereotypes about gender roles and perceived academic capabilities [1]. For example, Andersen [1] found that female students in STEM fields often face stricter grading standards than male peers, which underscores the need for gender sensitivity training for examiners.

3.2 Ethnic Bias

Ethnic bias can disadvantage students from minority backgrounds. This bias can be conscious or unconscious and can result from stereotypes and prejudices that affect the examiner's judgment [21, 22]. Warikoo et al. [22] found that minority students were often undervalued in academic assessments, which can lead to a lack of diversity in higher education and limit the opportunities available to these students. Addressing ethnic bias requires awareness and commitment to standardized and culturally sensitive evaluation practices.

3.3 Prestige Bias

Prestige bias occurs when students from prestigious universities receive more favorable evaluations compared to those from lesser-known institutions, even when the quality of their work is similar. De Cruz [5] demonstrated that institutional prestige can skew examiners' perceptions, leading to biased assessments. This highlights the need for standardized assessment criteria across institutions to ensure fair evaluations, regardless of the institution's reputation.

3.4 Cognitive Bias

Cognitive biases, such as the halo effect or confirmation bias, may also influence thesis assessments. These biases occur when an examiner's overall impression of a student or their preconceived notions affect their evaluation of the thesis [13]. For instance, the halo effect may lead an examiner to overvalue a thesis based on a student's past performance or reputation, while confirmation bias may cause the examiner to focus on aspects that align with preexisting beliefs.

3.5 Conflict of Interest Bias

An important dimension of bias arises when supervisors are involved in grading their own supervision. If the thesis is part of a project in which the supervisor has a vested interest, unconscious or conscious bias can influence the evaluation in favor of the student's work. This bias can manifest as overvaluation of the thesis quality or leniency in grading, which can distort the fairness of the assessment process. Although limited literature addresses this specific type of bias, it highlights the importance of independent evaluation practices to support fairness and uphold academic integrity in thesis assessments.

3.6 Norwegian Context and Research Gaps

In the Norwegian context, unique factors may influence thesis assessments. Many students, particularly in fields like Computer Science, write their theses in English, which may introduce language-related biases. For non-native speakers, language proficiency could inadvertently impact grading, either positively or negatively, depending on examiner expectations. Additionally, Norway's strong egalitarian culture may shape certain biases. For example, familiarity bias between students and examiners might be more prominent in smaller academic communities, while prestige bias could be less pronounced compared to countries with stronger hierarchical distinctions. However, there is limited empirical data on how these specific factors impact thesis assessment in Norway, highlighting the need for further research.

While international studies provide useful insights into assessment biases, empirical research specific to Norway is scarce. The potential impacts of factors like language proficiency and egalitarian cultural norms in Norwegian universities

remain underexplored. Additional research on these unique dimensions of bias would enable more tailored solutions, helping to ensure fair and objective thesis evaluations within the Norwegian educational system.

4 Current Practices and Challenges

In Norwegian universities, the assessment of master's theses typically involves both internal and external examiners to promote objectivity. However, this process faces several challenges. Although the Universities and Colleges Council (Universitets- og høgskolerådet, UHR) has provided recommendations for thesis evaluation [19, 20], adherence to these guidelines varies across study programs, leading to inconsistencies and potential biases [10, 7]. Variability in the application of standardized criteria may lead to differing expectations and approaches in evaluations, which could affect the consistency of student assessments.

In Computer Science, these challenges are especially pronounced. The rapid pace of technological change requires examiners to stay current with the latest developments to provide fair assessments. Additionally, the diverse range of topics within Computer Science, spanning theoretical foundations to practical applications, demands both broad understanding and flexible evaluation criteria. Ensuring that examiners, particularly external ones, have specialized knowledge and up-to-date expertise is essential for fair evaluations [8]. This complexity highlights the need for transparent and consistently applied criteria to mitigate the risks of biased or uninformed evaluations.

Another challenge is the potential for unconscious bias among examiners. Even well-intentioned examiners can be influenced by implicit biases, including those related to gender, ethnicity, or institutional affiliation, which may shape their perceptions of a student's work. In Computer Science, biases can also arise from varying familiarity with specific subject areas, complicating the assessment process further.

There is also a lack of empirical data on how these biases may impact thesis assessments specifically within the Norwegian context. Although international studies provide insights into assessment bias, there is limited Norwegian-specific research on issues such as the effects of language proficiency, familiarity biases, or cultural norms on grading. Conducting more localized studies would help to clarify the scope of these challenges and inform the development of solutions tailored to Norwegian institutions.

According to UH-loven §11–6 (formerly §3–9 (3)), the general assumption is to have a public defense for theses unless a student requests a private exam. Public defenses are important not only for transparency but also to allow external feedback, which can help identify instances of overly lenient or biased grading. However, many programs in Norway still do not consistently conduct public defenses, limiting the effectiveness of this safeguard against bias.

To address these challenges, including those specific to Computer Science, it is essential to implement transparent and consistently applied assessment

criteria across institutions. This uniformity promotes fairness and objectivity in evaluations. Additionally, training examiners to recognize and mitigate unconscious biases can further support fairer assessments [17]. Expanding the use of public defenses across programs offers an additional safeguard against potential bias.

Norwegian universities currently employ various evaluation practices, including external examiners, oral defenses, and appeal processes. While these practices are intended to ensure fairness, each presents its own challenges and potential biases. For example, appeal processes allow for re-evaluation in case of disputes, though they may delay final grading outcomes [9].

A recent Khrono article [10] highlighted how biased thesis evaluations can profoundly impact students' academic futures, particularly in cases where a grade of B or better is required for PhD program admission. This underscores the critical importance of addressing bias to ensure that all students have fair opportunities to advance in their academic careers.

5 Proposed Solutions

To address the biases identified in the assessment process, several strategies can be implemented:

5.1 Standardizing Assessment Criteria

Developing clear guidelines and rubrics that outline expectations for master theses across various disciplines, including Computer Science, can enhance consistency and fairness [17]. Standardized criteria help ensure that all students, including minorities and underrepresented groups, are evaluated according to the same standards, minimizing individual examiner biases. Transparent rubrics can make the evaluation process more predictable and objective. While rubrics are designed to promote transparency and consistency, research has indicated that they can also interact with implicit biases [6]. To maximize their effectiveness, rubrics should be thoughtfully developed and used alongside examiner training that targets the recognition and mitigation of implicit biases.

5.2 Excluding Thesis Supervisors from Formal Assessment

Excluding thesis supervisors from grading is a debated practice across Norwegian universities. While some programs already enforce this rule, others argue against it, believing that supervisors' in-depth knowledge of the student's work provides essential insights that external examiners may not fully capture. However, supporters of excluding supervisors from grading argue that supervisors may struggle with objectivity due to their close involvement, making it challenging to impartially assess their own guidance and feedback. They also note that disputes can arise between supervisors and external examiners, as seen in cases where

supervisors defend their grading views forcefully, occasionally leading to lengthy debates and tension.

At the University of Oslo, a balanced approach addresses these concerns: supervisors first provide an overview of the student's efforts and progress to the examination committee, then step away from the formal grading process, thereby allowing impartiality while contributing contextual insights. Similarly, some Swedish study programs assign a single examiner to assess all theses within a program, promoting consistency and reducing the risk of supervisor-related bias. Expanding such structured practices could help Norwegian universities balance objectivity with the contextual insights supervisors provide.

5.3 Training Programs for Examiners

Training programs can raise awareness of biases and provide strategies to counteract them. These programs may include workshops, seminars, and online courses covering topics such as implicit bias, cultural competency, and fair assessment practices [17]. For example, training examiners to recognize implicit biases can reduce the impact of gender, ethnic, and prestige biases during evaluations [1].

5.4 Impartial External Examination

External examiners play a crucial role in ensuring objectivity. Involving impartial examiners from different institutions can offer fresh perspectives and prevent conflicts of interest, particularly when supervisors may have a vested interest in the outcome. This practice, already common in Norwegian universities, should be reinforced to maintain fairness across disciplines.

Improving the Selection of External Examiners: To further improve fairness in thesis assessment, the process of selecting external examiners should be refined. Currently, supervisors often propose external examiners, which can lead to conflicts of interest. There have been cases where supervisors proposed their spouse as the external examiner, raising concerns about impartiality. To address this, the following measures are suggested:

1. **Independent Selection Committee**: Establish a committee within each department responsible for selecting external examiners. This committee should include faculty members who are not directly involved in the supervision of the theses being assessed. Furthermore, the members should have sufficient academic expertise in the relevant disciplines to ensure that examiners are selected based on their qualifications and fit with the thesis subject.
2. **Transparency and Documentation**: Ensure that the selection process is transparent and well-documented. The criteria for selecting external examiners should be clearly defined and transparent, including qualifications, field expertise, and prior experience in thesis assessment.

3. **Conflict of Interest Policy**: Implement a strict conflict of interest policy that prohibits supervisors from proposing or influencing the selection of external examiners. The policy should clearly define what constitutes a personal or professional relationship, and examiners should declare any potential conflicts of interest before accepting the role.
4. **Regular Rotation**: Rotate external examiners regularly to prevent the development of close relationships between examiners and supervisors. A regular rotation policy (e.g., every 3-5 years) can help maintain objectivity and impartiality in the assessment process.
5. **External Examiner Pool**: Create a pool of qualified external examiners from different institutions and disciplines. This pool can be used to randomly assign examiners to theses, ensuring a diverse and fair assessment process. The pool should be regularly updated to include experts from a wide range of academic fields, ensuring relevance to the thesis topics.

5.5 Leveraging Technology and AI-Assisted Review

Using technology such as plagiarism detection software, automated grading systems, and AI-driven tools can help provide additional data points to support examiners' evaluations and reduce biases [18]. These tools aid in objectively measuring writing quality, originality, and adherence to guidelines. However, reliance on such systems must be managed carefully. Research highlights that algorithmic limitations and biases embedded in data sets can reinforce or introduce new biases [2]. Additionally, technology can be used to track and monitor assessment processes, providing data to identify and address potential biases over time.

5.6 Continuous Monitoring and Evaluation

Implementing continuous monitoring and evaluation of the assessment process can help identify and rectify biases over time. This involves collecting data on assessment outcomes and regularly reviewing and updating assessment criteria and procedures. By analyzing trends in grading, institutions can detect patterns of bias and implement corrective actions, ensuring that all students receive fair assessments.

5.7 Public Defense

Although the UH-loven §11–6 (formerly §3–9 (3)) stipulates that thesis defenses must be public unless a private defense is specifically requested and approved, many Norwegian study programs do not consistently follow this practice. Standardizing public defenses across programs could enhance transparency and allow external observers to provide feedback, reducing the potential for biased or overly lenient grading. Public defenses also allow broader scrutiny, aligning Norwegian universities with international standards and increasing the overall quality and accountability of thesis evaluations [10, 9].

5.8 Student Involvement in Criteria Development

Involving students in the development of assessment criteria can improve transparency and promote fairness. Although rare in Norwegian universities, examples from Lund University in Sweden show the benefits of this practice. Students engage in peer review during thesis defenses, posing questions to their peers and contributing to the evaluation process. This approach not only enhances accountability but also ensures that assessment criteria reflect academic rigor and student expectations. Other Swedish universities are adopting similar practices, highlighting the value of incorporating student perspectives in the assessment process.

6 Recommendations for Reducing Bias

In addition to the proposed solutions, the following recommendations provide further strategies for practical implementation of bias reduction in master thesis assessment in Norwegian universities:

1. **National Standardized Guidelines and Accountability**: Develop comprehensive, standardized national guidelines for thesis assessment. These guidelines should be flexible enough to accommodate disciplinary differences but consistent in providing a framework for fair evaluation. Instituting accountability mechanisms, such as independent oversight, can ensure that all institutions adhere to these standards, fostering fairness and transparency.
2. **Mandatory Bias Training Across Institutions**: Establish a nationwide program mandating regular bias training for all faculty involved in thesis assessment. Training modules should address biases specific to thesis evaluation, including those related to gender, ethnicity, and institutional prestige.
3. **Audit-Based Assessments**: Conduct regular audits not only to identify trends in thesis grades but also to pinpoint patterns of bias. These audits should focus on identifying discrepancies based on gender, ethnicity, language proficiency, and other relevant factors. Independent auditors should review a sample of thesis evaluations to ensure impartiality and transparency.
4. **Support for Non-Native Students**: Expand language support services to ensure that language proficiency does not unintentionally affect assessment quality. Faculty should receive training to distinguish between content quality and language clarity, and rubrics should reflect this distinction.
5. **Diverse Evaluation Panels**: Ensure that thesis evaluation panels are composed of diverse members, including representatives from different genders, ethnic backgrounds, and academic specializations. This will foster a balanced evaluation process, particularly for interdisciplinary theses.
6. **Confidential Feedback Mechanisms and Appeals Process**: Introduce confidential feedback channels for students to report perceived biases in their thesis assessment without repercussions. A transparent appeals process

should also be in place, allowing students to contest assessments they believe were biased.

7. **Interdisciplinary Assessment Training**: Develop training programs specifically tailored for assessing interdisciplinary and cross-disciplinary theses. This will help ensure that innovative work that spans multiple fields is evaluated fairly and comprehensively, avoiding biases based on discipline-specific expertise.
8. **Ongoing Research and Continuous Improvement**: Fund long-term research into bias in Norwegian thesis assessments, ensuring that bias reduction strategies evolve with emerging evidence. This research should track the effectiveness of existing interventions and propose new approaches based on emerging data.
9. **Enforcing Public Defense**: Public defenses are critical for ensuring transparency in the assessment process. By allowing external participants to attend and offer feedback, public defenses can counteract potential biases, ensuring that the grading process is thorough and fair, as stipulated by the UH-loven.

7 Legal and Institutional Frameworks

The Norwegian higher education system is governed by the *Universities and University Colleges Act (UH-loven)* [15], which establishes the legal framework for universities and colleges in Norway. This act includes provisions to ensure fair and unbiased assessments, emphasizing transparency in evaluation criteria and granting students the right to appeal assessment decisions. The UH-loven, both in its former §3–9 (1) and new §11–6, mandates that universities and colleges provide impartial and academically sound evaluations, including the requirement for external examiners to maintain academic standards.

Although public defenses of master theses are mandated by law, many programs continue to hold private presentations, which undermines the law's intent to promote transparency and accountability. Institutions must adhere to the legal requirement of conducting public defenses unless special circumstances justify a private exam.

UHR has provided guidelines to encourage standardized criteria for thesis evaluations [19, 20]. These guidelines emphasize the importance of academic integrity, aiming to ensure that assessments focus solely on the quality of the student's work. However, inconsistent application of these guidelines across institutions has led to variations in assessment practices, which can affect the overall fairness and equity of thesis evaluations.

The Norwegian anti-discrimination law, as outlined in *Lov om likestilling og diskriminering* [14], prohibits discrimination based on gender, ethnicity, religion, disability, sexual orientation, gender identity, and gender expression. While this law aims to ensure equitable treatment, its effectiveness depends on consistent enforcement across institutions, with room for improvement in ensuring all institutions fully comply.

Although these legal and institutional frameworks can provide a solid foundation for addressing bias in thesis assessments, their impact relies on rigorous and uniform enforcement. To enhance fairness and quality in thesis assessments at Norwegian universities, it is crucial for institutions to regularly review their assessment procedures, seek feedback from students and faculty, and ensure that examiners receive ongoing professional development. These steps are essential for continuously improving assessment practices and ensuring alignment with both national laws and institutional guidelines.

8 Implications for Computer Science Education

The implications of biased thesis assessment are particularly significant in the field of Computer Science. The rapid pace of technological advancement and the broad range of subfields necessitate fair and accurate assessments to ensure that all students, regardless of background, have equal opportunities to succeed.

8.1 Impact on Students

Biased assessments can undermine the confidence and motivation of students, particularly those from underrepresented groups. This discouragement can lead students away from further studies or careers in Computer Science, increasing the diversity gap in the field. When students from minority backgrounds perceive bias in thesis or project evaluations, they may be less inclined to pursue higher academic achievements, resulting in reduced diversity across both academic and industry environments.

8.2 Impact on the Field

A lack of diversity in Computer Science can limit the range of perspectives and ideas, potentially hindering innovation and progress. Ensuring fair and unbiased assessments at the thesis level can foster greater diversity and inclusion in the field, leading to a wider range of ideas and solutions for technological challenges. Diverse teams have been shown to bring a variety of viewpoints, which encourages creativity and produces more comprehensive solutions, which is essential in a fast-evolving field like Computer Science.

8.3 Recommendations for Computer Science Programs

To address bias in thesis assessments, Computer Science programs should implement measures to promote fairness and inclusivity. These measures include developing standardized assessment criteria, offering bias-awareness training for examiners, and leveraging technology to support objective grading. Programs should also institute ongoing monitoring to identify and address any emerging biases in assessment practices.

Additionally, fostering an inclusive academic culture that values diversity is essential. Initiatives such as mentorship programs for underrepresented students and diversity training for faculty can further support a balanced and equitable environment. Keeping assessment criteria aligned with the latest technological advancements is also critical. By integrating current industry standards, programs ensure evaluations remain relevant, allowing students to be assessed on up-to-date skills and knowledge.

By adopting these strategies, Computer Science programs can help build a more equitable, diverse, and innovative discipline, enhancing both academic quality and the field's potential to address complex societal challenges.

9 Conclusion

Addressing bias in master's thesis assessment is essential for fostering fairness and upholding integrity in Norwegian higher education. Implementing standardized assessment criteria, providing comprehensive examiner training, leveraging technology, and ensuring transparency through public defenses are all key strategies for enhancing the quality and impartiality of thesis evaluations. Continuous monitoring and periodic refinement of these practices will help ensure that all students, regardless of background, are assessed equitably, thus reinforcing the credibility of the higher education system and benefiting both students and institutions.

While this study has highlighted existing challenges and proposed solutions, it did not incorporate empirical data specific to Norwegian universities, suggesting an important area for further research. Conducting localized studies to better understand the nuances of bias within Norwegian thesis assessments will be invaluable in refining and tailoring these solutions. Future research should investigate the effectiveness of these interventions and explore additional methods for mitigating bias in academic assessment.

Universities must remain committed to fostering a culture of fairness and inclusion, where diversity is actively valued, and all students are supported to reach their full potential. The lessons learned from addressing bias in thesis assessments could also be extended to other areas of higher education, contributing to a broader effort toward equity and inclusion. By remaining vigilant and proactive, institutions can work toward a fairer educational landscape, where students are evaluated solely based on their true abilities and contributions.

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