

Paper format: Oral Presentation

Investigation into Barriers and Enablers of Alternative Assessment in Higher Education STEM programmes

Sam Woodford¹, Viola Hélène Lobert¹

¹Department of Mechanical, Electrical and Chemical Engineering, Oslo Metropolitan University, Norway

Abstract: While the benefits of alternative assessment seem clear when it comes to student learning, many educators still fail to move away from traditional examinations. This study explores the perceived barriers and enablers influencing the adoption of alternative assessments among course coordinators in STEM programmes at Oslo Metropolitan University. Using a qualitative survey adapted from O’Neill and Padden (2022), responses from 24 educators were analysed to identify key factors shaping assessment choices. Consistent with other studies, results indicated that major barriers included time constraints, limited financial and institutional support and concerns over fairness of assessment. Enablers included resources, institutional backing and access to example assessments from similar courses. Interestingly, while educators did not perceive their own competence as a barrier, the demand for more examples suggests an underlying lack of confidence in implementing alternative assessments. This study highlights a strong alignment between barriers and enablers, reinforcing the need for targeted institutional policies. To facilitate the transition, the authors recommend redistributing workload, increasing financial and human resources, and fostering knowledge-sharing initiatives. These findings contribute to a broader discussion on assessment practices, offering insights for institutions seeking to promote diverse and effective evaluation methods that align with contemporary educational objectives.

Key Words:

Assessment, Alternative Assessment, Barriers, Enablers, Higher Education, STEM

1 Introduction

Assessment is a fundamental component of higher education, shaping what and how students learn throughout their studies. In the rapidly evolving landscape of education, there is an increased recognition that assessment should align with the skills and competencies students require in a professional setting. The traditional model – typically characterised by closed-book, time-limited examinations – has been challenged for its limitations in evaluating complex problem-solving, creativity, communication, collaboration and other essential 21st-century skills (Binkley et al., 2012). Consequently, a shift towards more learning-focused and authentic assessment practices has gained momentum.

Authentic assessment refers to evaluation methods that mirror real-world applications, requiring students to apply their knowledge in meaningful and contextually relevant ways (Rodríguez-Gómez & Ibarra-Sáiz, 2015). Such assessment has been shown to foster deeper learning, improve motivation, and enhance the development of transferable skills (Kusurkar et al., 2023). Moreover, growing evidence suggests that alternative assessment strategies – including the assessment of practical work, oral presentations and reflective portfolios – contribute to increased student engagement (O'Neill & Padden, 2022) and can assess all aspects of competence such as collaborative work, analytical skills and communication (Iborra et al., 2014).

Despite these documented benefits, many educators remain hesitant to adopting alternative assessment approaches. Institutional constraints, resource limitations and concerns over fairness of assessment often deter course coordinators from moving away from traditional examinations (O'Neill & Padden, 2022). This study seeks to explore the barriers and enablers that shape educators' perceptions on alternative assessment in higher education STEM programmes. Through a qualitative survey conducted among STEM course coordinators at Oslo Metropolitan University (OsloMet), we examined the factors influencing assessment choices and highlight potential strategies to support a broader adoption of alternative assessment practices. By understanding these challenges and opportunities, this research aims to inform institutional policies and pedagogical approaches that can better align assessment methods with contemporary educational goals.

1.1 Definitions

For this paper, traditional assessment is defined as a closed-book, supervised, individual, timed examination, while alternative assessments include any other type of assessment. The authors acknowledge that this is not a universal definition as many would argue essays and reports are not non-traditional. However, **traditional** and **alternative** are used here as placeholders for closed-book examinations and everything else, respectively.

An enabler is any resource (time, leadership support, example assessments, etc) that facilitates alternative assessment, while a barrier is anything that makes its introduction less attractive. Barriers include a lack of above-mentioned resources but can also extend to socio-psychological factors such as lack of confidence by course coordinators in alternative methods, lack of confidence of the course coordinators to deliver and other

concerns. A course coordinator is an educator responsible for designing and implementing course assessments.

1.2 Goals

The goal of the investigation was to have a better understanding of the perceptions of course coordinators regarding alternative assessments, specifically, what their perceived barriers and enablers are. It is hoped that results from this study can be used to identify ways to encourage course coordinators to adopt alternative assessments.

2 Methodology

The survey was sent out electronically to all course coordinators (a total of 117) at the following STEM programmes at OsloMet: Mechanical Engineering, Electrical Engineering, Biotechnology and Applied Chemical Engineering, Construction Engineering, Energy and Environmental Engineering, Biomedical Laboratory Science. Alternative assessment was clearly defined at the beginning of the survey as ‘An alternative assessment method is any assessment method that is not a closed-book supervised examination (from now on referred to as a ‘traditional exam’)’.

The survey questions were largely adapted from the framework developed by O’Neill and Padden (2022), which investigated barriers and enablers to diverse assessment methods at University College Dublin. Our survey included additional questions regarding educators’ own experience with alternative assessments, both as students and instructors to provide deeper insight into how prior exposure influences attitudes toward implementation.

3 Results

3.1 Participant Make-up and General Experience with Assessment

24 course coordinators fully completed the survey (20.5%). Educators within several STEM disciplines responded to the survey, with electrical engineering course coordinators making 29.2% of the submissions, followed by mechanical engineering (16.7%), biotechnology and applied chemical engineering (16.7%), energy and environmental engineering (16.7%), construction engineering (12.5%) and biomedical laboratory science (8.3%). Importantly, most of the educators (54.2%) had more than 15 years of experience working in higher education and had been coordinators for more than 5 different courses (62.5%).

Educators were asked what sort of assessments they experienced as students. Every participant had taken at least one form alternative assessment during their time as students. Unsurprisingly, the majority (95.8%) had traditional examinations, but many also had oral examinations (70.8%), reports from practical work (66.7%), presentations (62.5%) and laboratory participation (45.8%). Several educators appreciated project-based assignments for their hands-on learning benefits, engagement, and real-world

applicability. Practical examinations were seen as a fair way to assess technical skills, though oral exams were perceived as stressful, especially for theoretical subjects.

Additionally, almost all educators had experience delivering an alternative assessment (92%), with a round third delivering 6 or more alternative assessments. It should be noted however that some were 'forced' to do alternative assessment due to the COVID-19 pandemic or due to inheriting a certain course. Of the alternative assessments introduced by the educators, oral exams (55%), presentations (55%) and reports (59%) were the most popular choices. They were used at 2nd year (68%) and 3rd year (64%) bachelor level prominently.

3.2 Opinions on Alternative Assessments

The strongest opinion on assessments related to concerns about cheating. Traditional exams were perceived as more secure with 79% of educators fearing that students could cheat on alternative assessments. Furthermore, cheating was mentioned several times in the free text responses. Other opinions that gathered large agreement was that alternative assessments increase student engagement and help develop soft-skills with 67% and 75% of educators agreeing or strongly agreeing with these statements respectively. Opinions on concerns about grade inflation and whether alternative assessments assessed students and learning outcomes more favourably were relatively neutral, with similar numbers of agreement and disagreement. Educators largely disagreed that alternative assessments were easier or cheaper to implement than traditional ones (46% and 42%).

3.3 Perceived Barriers

Course coordinators were asked to rank different potential barriers to introducing alternative assessment as no barrier/ some barrier/ significant barrier/ N/A. Consistent with other studies (O'Neill & Padden, 2022), lack of time (62.5%) and no financial or technological resources (50%) were the most reported 'significant barrier'. Lack of motivation also played a role, being ranked by 50% as having 'some barrier' and 21% as a 'significant barrier'. Interestingly, equity of the assessment to the previous assessment was ranked as 'some barrier' by 50% of the course coordinators and a 'significant barrier' by 9%, indicating concerns about fairness in assessment methods. Importantly, 46% of educators ranked the lack of examples from their own discipline as 'some barrier', and 17% as a 'significant' barrier. Lack of support from management (25% 'significant barrier', 25% 'some barrier') as well as limited support from colleagues (17% 'significant barrier', 33% 'some barrier') were also ranked as barriers. In contrast to other studies (O'Neill & Padden, 2022), fear of grade inflation was not a barrier that ranked high (Figure 1).

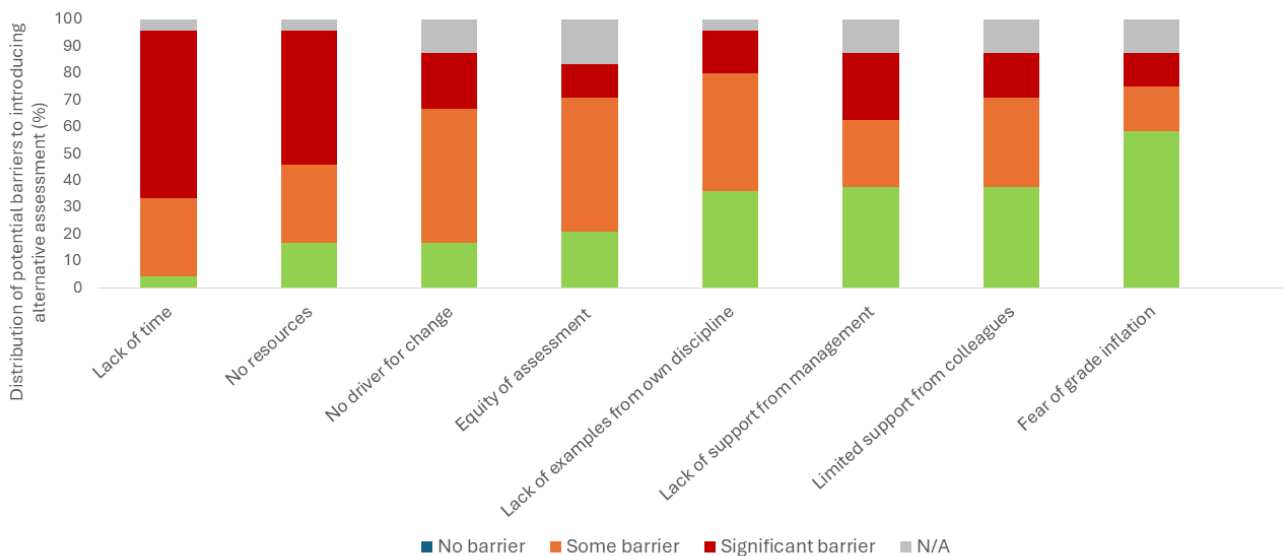


Figure 1. Barriers identified to impeding the implementation of alternative assessment

3.4 Enablers

Many course coordinators highlighted enablers, as shown in Table 1. Notably, the main barriers and enablers are closely aligned. Educators emphasised the need for more time to implement alternative assessments. Leadership support was mentioned both as an important barrier and the second most-mentioned enabler, with many educators calling for additional financial resources and allocated manpower, such as teaching and laboratory assistance. Another key enabler was access to example alternative assessments from similar courses, which educators viewed as essential for successful implementation.

Table 1. Key enablers in implementing alternative assessment

Enabler	Explanation
Time and resources	Need for allocated time and efficient systems
	Importance of staff and financial support
Management and institutional support	Strong support from management, faculty
	Suggestion of decentralisation of administrative support
Better knowledge and training on alternative assessment	Share some examples that have succeeded with alternative assessment
Ensuring fair and effective assessment	Studies on how effective alternative assessment is
Addressing scalability	A key concern is the challenge of large classes
	More resources and grading support were suggested

3.5 Perceived Benefits of Implementing Alternative Assessment

Alternative assessments were valued for their varied learning opportunities in developing soft skills (40%) and increasing student engagement (77%). Educators also perceived them as more authentic than traditional assessments (64%) and better at testing more diverse learning outcomes (59%). Traditional exams were perceived as a better use of resources with only 23% stating that alternative assessments were more efficient use of their time and students' time. Interestingly, educators did not perceive implementation of alternative assessments as supporting their own personal development (14%) or as an effective response to institutional drivers of change (4.5%) (Figure 2).

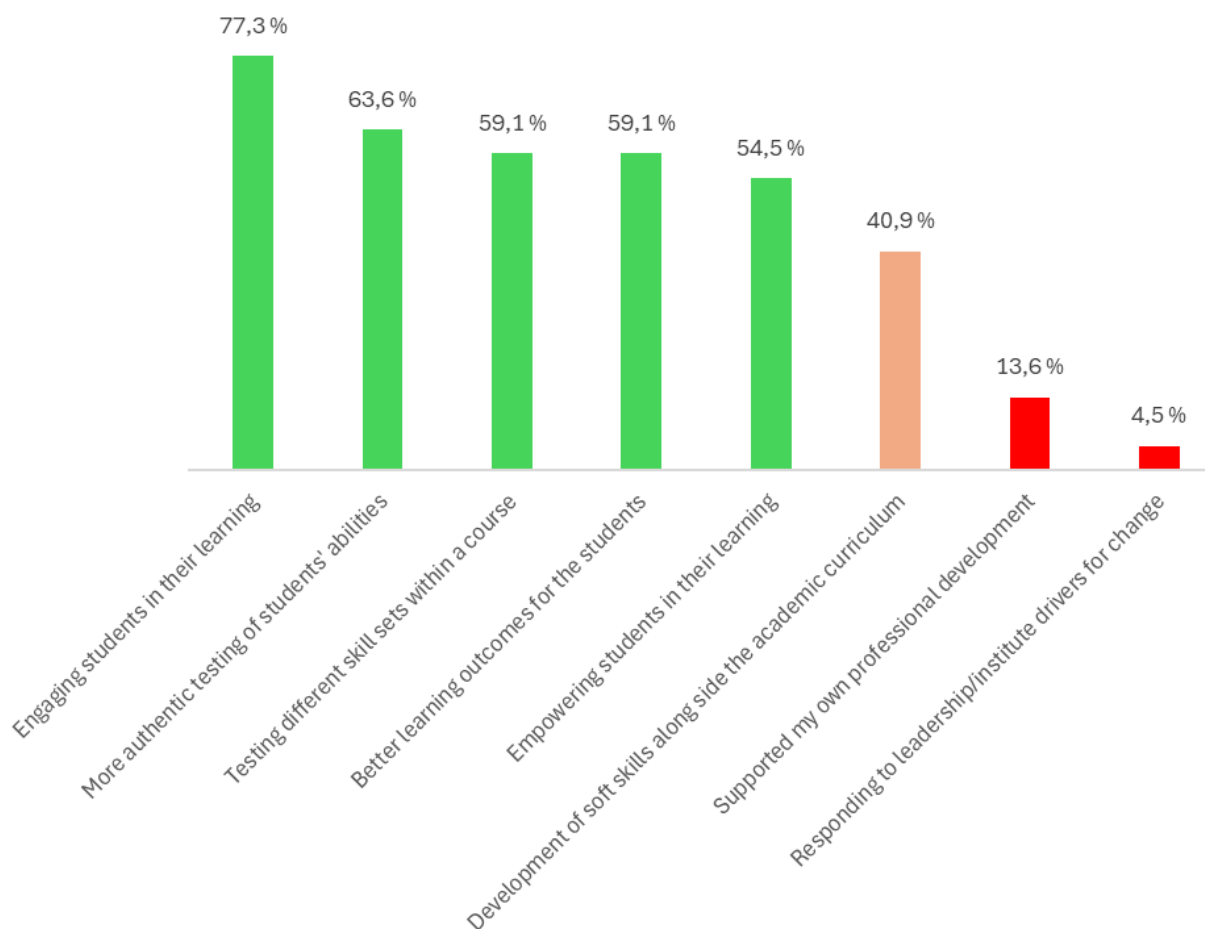


Figure 2. Educators' perceived benefits of their own alternative assessments.

3.6 Other Note-Worthy Responses

Many educators shared insightful responses through the free text option which did not directly answer a question, but are interesting, nonetheless. Here is a short summary of them:

- Alternative assessments often lack the anonymity of traditional assessments so therefore can be vulnerable to bias
- Alternative assessments can cause a different form of stress to students compared to traditional assessments
- Different assessments methods can be mixed to effectively cover their respective weaknesses. For example, group-based projects with individual oral examinations
- Those who have implemented alternative assessments generally were unsatisfied with them due to time constraints

4 Discussion

4.1 Criticism of Methodology and Results

During the investigation it was observed that the survey had systematic and human flaws. Free text responses revealed that some educators were unclear on definitions and boundaries of the survey, despite these being explained clearly at the beginning. One response simply states:

“I am not sure about what alternative exams means.”

This reduced confidence in the final results. However, given the remaining responses, it appears the survey and definitions were largely understood.

A systematic criticism of the survey is that the authors had a clear positive bias towards alternative assessments, which may have influenced the questioning by limiting concerns about alternative assessments. However, free text questions educators to express opinions, mitigating this slightly.

Many educators expressed concerns about cheating. This common fear suggests it should have been considered a barrier, but the survey was not constructed to fully capture these opinions.

The survey was also less anonymous than intended. Given the institute’s size, responses could sometimes be linked to individuals based on age or programme experience. While the authors did not do this, the possibility may have affected responses.

A final criticism is that the survey used varied question formats: a 5-point Likert scale for opinions, a 3-point Likert for barriers and free text for enablers. This could make data comparison problematic, but as analysis focused on individuals rather than cross-question comparisons, this variation should not significantly impact results.

4.2 Analysis of Key Barriers and Enablers

The barriers could be sorted into two primary groups:

1. Resource constraints
2. Lack of Intuitional support

Resource-related barriers include time, manpower and financial constraints, while institutional barriers stem from a lack of support from colleagues, leadership and motivation for change. Similarly, enablers fall into these categories, with extra resources and institutional support being the most

significant. The alignment between barriers and enablers suggests a cohesive perspective among educators.

One key enabler that does not fit into either category is access to example alternative assessments from similar courses. Despite identifying this as a major enabler, educators overwhelmingly denied that their own competence or confidence was a barrier. This contradiction suggests an underlying lack of confidence in implementing alternative assessment. Regardless, educators clearly value example assessments as a crucial enabler.

4.3 Further Work

It is hoped that results from this study can be used to identify ways to encourage course coordinators to adopt alternative assessments. The goal was to identify the key enablers and barriers to adoption of alternative assessments. After completing the investigation, the authors recommend the following to institute leaders if they wish to encourage educators to adopt alternative assessments:

- Allocate work hours in an employee's workplan if they wish to develop an alternative assessment
- Support implementation with financial resources for new digital and/or physical work tools
- Support implementation with allocation of teaching and laboratory assistants
- Create a system for colleagues to pool and share alternative assessments and experiences

References

- Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M., & Rumble, M. (2012). Defining Twenty-First Century Skills. In P. Griffin, B. McGaw, & E. Care (Eds.), *Assessment and Teaching of 21st Century Skills* (pp. 17-66). Springer Netherlands. https://doi.org/10.1007/978-94-007-2324-5_2
- Iborra, M., Ramírez, E., Tejero, J., Bringué, R., Fité, C., & Cunill, F. (2014). Revamping of teaching–learning methodologies in laboratory subjects of the Chemical Engineering undergraduate degree of the University of Barcelona for their adjustment to the Bologna process. *Education for Chemical Engineers*, 9(3), e43-e49. <https://doi.org/https://doi.org/10.1016/j.ece.2014.04.002>
- Kusurkar, R. A., Orsini, C., Somra, S., Artino, A. R., Jr., Daelmans, H. E. M., Schoonmade, L. J., & van der Vleuten, C. (2023). The Effect of Assessments on Student Motivation for Learning and Its Outcomes in Health Professions Education: A Review and Realist Synthesis. *Academic Medicine*, 98(9). https://journals.lww.com/academicmedicine/fulltext/2023/09000/the_effect_of_assessments_on_student_motivation.30.aspx
- O'Neill, G., & Padden, L. (2022). Diversifying assessment methods: Barriers, benefits and enablers. *Innovations in education and teaching international*, 59(4), 398-409. <https://doi.org/10.1080/14703297.2021.1880462>
- Rodríguez-Gómez, G., & Ibarra-Sáiz, M. S. (2015). Assessment as Learning and Empowerment: Towards Sustainable Learning in Higher Education. In M. Peris-Ortiz & J. M. Merigó Lindahl (Eds.), *Sustainable Learning in Higher Education: Developing Competencies for the Global Marketplace* (pp. 1-20). Springer International Publishing. https://doi.org/10.1007/978-3-319-10804-9_1

Alternative Assessments in Higher Education

Alternative Assessment in Higher Education

What is the purpose of this survey?

We would like to investigate the use of alternative assessments in higher education, specially within STEM programmes and courses. Specifically, we are interested to hear about attempts educators have made to introduce alternative assessments and for educators who have not introduced any, what their perceived barriers and enablers would be.

For the purpose of this survey we have defined "alternative assessment" as:

An alternative assessment method is any assessment method that is not a closed-book supervised examination (from now on referred to as a 'traditional exam'). It does not matter if the alternative assessment contributes 10% or 100% of the final grade. Assessments which are graded as pass/fail or mandatory assignments in order to qualify for an examination are not to be considered when answering the below questions.

The target audience for this survey are course responsables. Participants of the survey will be anonymous. Broad fields of study and discipline will be identifiable. The survey will take approximately 10-15 minutes to complete. Participation in this survey is voluntary and you can choose not to take part. Deadline for responses is **Friday 7th February 2025**.

If you have any questions please contact samwood@oslomet.no or violalob@oslomet.no.

Thank you for your time!

General Information

Please select your (primary) programme

- Mechanical Engineering
- Electrical Engineering
- Biotechnology and Applied Chemical Engineering
- Construction Engineering
- Energy and Environmental Engineering
- Biomedical Laboratory Science
- Other

What age group do you belong to?

- 25-35 years
- 35-45 years
- 45-55 years
- 55-65 years
- 66 or older

How long have you been working in Higher Education?

- Less than 1 year
- 1-5 years
- 6-10 years

11-15 years

Longer than 15 years

How many different courses have you been the course responsible for?

0

1-2

3-4

5-6

7-8

8+

What type of assessments did you experience at university?

Select all that apply

Closed book school exam

Oral exam

Presentation

Laboratory Participation

Model building

Simulation assignment

Demonstration

Reports (from practical work)

Reports (other)

Other (please mention)

If you chose 'Other' in the above question, please describe your alternative assessment.

What are your memories of the alternative assessments you did as a student?

Think in terms of engagement, learning outcomes, time spent, soft skills and stress.

State how much you agree with the following statements regarding alternative assessments

Alternative assessments are usually easier than traditional exams

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

N/A

Alternative assessments are better at assessing the whole curriculum compared to traditional exams

Strongly disagree

Disagree

Neutral

Agree
Strongly agree
N/A

Alternative assessments will lead to grade inflation

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

It is harder for some students to cheat on traditional exams

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

Traditional exams give a better reflection of individual students' abilities

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

Alternative assessments are easier to implement

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

Alternative assessments are cheaper for the institute

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

The institute is more concerned with passing rates than assessment quality

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

N/A

Alternative assessments increase student engagement

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

N/A

There is not enough evidence to show that alternative assessments are better than traditional assessments

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

N/A

Alternative assessments are just a 'fad'

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

N/A

Alternative assessments help develop soft skills

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

N/A

Barriers to introducing alternative assessments.

Rate these potential barriers to introducing alternative assessment.

No driver for change

No barrier
Some barrier
Significant barrier
N/A

My confidence to try it

No barrier
Some barrier
Significant barrier
N/A

My competence (i.e. my knowledge and/or skills to introduce it)

No barrier
Some barrier
Significant barrier
N/A

Risk to my reputation if it doesn't go well

No barrier
Some barrier
Significant barrier
N/A

Students' resistance to change

No barrier
Some barrier
Significant barrier
N/A

Fear of students failing

No barrier
Some barrier
Significant barrier
N/A

Fear of grade inflation

No barrier
Some barrier
Significant barrier
N/A

Equity of the assessment to the previous or other assessment

No barrier
Some barrier
Significant barrier

N/A

Lack of recognition or reward for me to do it

No barrier

Some barrier

Significant barrier

N/A

Limited support from peers/colleagues

No barrier

Some barrier

Significant barrier

N/A

Lack of support from management

No barrier

Some barrier

Significant barrier

N/A

Lack of time

No barrier

Some barrier

Significant barrier

N/A

No resources to support the change, i. e. financial or technological

No barrier

Some barrier

Significant barrier

N/A

Lack of examples from my discipline

No barrier

Some barrier

Significant barrier

N/A

Risk to School/ or programme reputation

No barrier

Some barrier

Significant barrier

N/A

Professional or other external barriers to change.

No barrier

Some barrier

Significant barrier

N/A

What would be one key enabler to implementing alternative assessments?

My example/implementations of alternative assessments

This section give you a chance to share your direct experience with alternative assessments. If you have not attempted any alternative assessments, then you may skip the following open text questions.

I have implemented an alternative assessment

Select all that are relevant

once, on my own initiative

2-3 times

4-6 times

6 or more times

once or more, but it was not my choice (for example due to pandemic, inheriting a course from someone else etc)

Never

If you implemented an alternative assessment that wasn't your choice, what was the reason(s)?

For example, you can write 'pandemic'

What type of alternative assessment did you implement?

Oral exam

Presentation

Report (from a practical activity)

Report (other)

Model building

Other (please state below)

If you chose 'Other' in the above question, please describe your alternative assessment

What level was your assessment used at?

1st year bachelor

2nd year bachelor

3rd year bachelor

1st year master's

2nd year master's

other

What were the perceived benefits of the alternative assessments?

Select all that apply

Accommodating the learning of diverse students in my class

Testing different skill sets within a course
Engaging students in their learning
Empowering students in their learning
Supported my own professional development
Opportunity to try something new
Responding to leadership/institute drivers for change
More efficient use of my time
More efficient use of students' time
Better learning outcomes for the students
More authentic testing of students' abilities
Improved classroom environment
Development of soft skills along side the academic curriculum
Other (please state below)

If you chose 'Other' in the above question then please describe

To what degree were these alternative assessments discussed with the program team?

To what degree were these alternative assessments discussed with the institute leadership?

and/or department leader or head of studies

Please rate your alternative assessment in the follow categories

The assessment was very different from current or previous assignments the students had seen.

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

The assessment needed lots of time to implement compared to traditional assessment

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

The assessment needed lots of resources to implement compared to traditional assessments

Strongly disagree
Disagree
Neutral

Agree
Strongly agree
N/A

More outcomes were assessed using alternative assessment

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

Student learning outcomes were improved

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

Students seemed more motivated by the alternative assessment

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

I was supported by leadership to introduce the alternative assessment

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

I was supported by administration to implement the assessment

Strongly disagree
Disagree
Neutral
Agree
Strongly agree
N/A

Please elaborate on why you think your alternative assessment was successful or not

How sustainable were the alternative assessments you implemented?

The implementation can be sustained over time, i.e. in subsequent years

Strong disagree

Disagree

Neutral

Agree

Strong agree

N/A

The implementation can be applied by others teaching the same course

Strong disagree

Disagree

Neutral

Agree

Strong agree

N/A

A similar course could use this type of assessment successfully

Strong disagree

Disagree

Neutral

Agree

Strong agree

N/A

How helpful would example assessments from your discipline in supporting your decision to change assessments be?

For example, a lab exercise given in a similar course at a different university

Extremely useful

Very useful

Neutral

Not so useful

No use at all

N/A

Depends (please comment below)

If you chose 'Depends' in the above question, then please describe.

How do you feel you could be better supported to change to alternative assessments?

Are there any other comments or feedback you would like to make about alternative

assessments?

This is the end of the survey.

Thank you for taking the time to complete it.

If you would be willing to discuss or share more information on alternative assessments, then please contact us.

samwood@oslomet.no or violalob@oslomet.no.