

RESEARCH DIRECTIONS

Which Assessment Type is Beneficial, and which is Detrimental to the Overall Student Educational Experience?

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Abstract

The growing shift from closed-book examinations to open-book assessments has prompted renewed debate regarding their influence on students' academic performance and long-term knowledge retention. Critics argue that open-book formats may encourage superficial engagement with learning materials, whereas proponents contend that they foster deeper understanding by requiring students to apply knowledge, synthesise information, and solve complex problems rather than rely solely on memorisation. This teaching research project investigates student perceptions of these differing assessment types through a discrete online questionnaire administered to learners across levels 3 to 6. A further dimension of the study explores students' reliance on artificial intelligence (AI) tools when completing open-book assessments. As AI technologies become increasingly accessible, their use raises important questions about academic authenticity, the development of independent critical thinking skills, and the extent to which students genuinely engage with subject content. By examining both attitudes toward assessment formats and patterns of AI use, this research aims to contribute meaningful insights to ongoing discussions surrounding effective assessment design. The findings have the potential to inform future pedagogical strategies, ensuring that assessment practices support both academic integrity and meaningful learning.

Introduction

Assessments have long played a central role in shaping students' educational experiences, often acting as both a measure of learning and a significant source of stress. Traditional closed-book examinations have been associated with heightened anxiety due to their emphasis on memorisation and high-stakes performance (Putwain, 2008a, Putwain, 2008b). In recent years, however, higher education (HE) institutions have increasingly shifted toward open-book assessments, a change accelerated by the move to online learning environments. Many students perceive this transition as a welcome development, reporting reduced exam-related stress and greater flexibility in demonstrating their understanding (Durning et al., 2016). Despite these perceived benefits, the shift has sparked considerable debate among academics regarding its implications for knowledge retention, academic integrity, and the evolving role of digital technologies in assessment practices.

The first major concern centres on the impact of open-book assessments on students' depth of learning. Critics argue that allowing access to notes and resources may encourage surface-level engagement, with students relying on materials rather than internalising key concepts (Roediger and Karpicke, 2006). This perspective is grounded in cognitive psychology research demonstrating that retrieval practice, central to closed-book exams, enhances long-term retention more effectively than passive review. Conversely, proponents of open-book formats contend that these assessments promote higher-order thinking by requiring students to apply, analyse, and synthesise information rather than simply recall it (Heijne-Penninga et al., 2008). Green et al. (2016) further argue that open-book assessments better reflect real-world professional contexts, where individuals routinely consult resources to solve complex problems. Their findings suggest that such assessments not only improve student engagement with learning materials but also enhance the overall student experience by reducing unnecessary memorisation.

A second dimension of the debate concerns the rapid rise of artificial intelligence (AI) tools and their integration into students' study practices. With the emergence of sophisticated generative AI systems, students now have access to powerful tools capable of producing written content, summarising complex topics, and generating solutions to assessment tasks. While these technologies offer potential benefits such as personalised feedback and support for students with diverse learning needs, they also raise significant concerns about academic integrity. Ncube, et al. (2026) highlight growing apprehension among educators regarding AI-generated submissions, which can obscure the authenticity of student work and challenge traditional notions of assessment validity. As universities grapple with how to regulate or incorporate AI tools, understanding students' reliance on these technologies becomes increasingly important for designing fair and effective assessment strategies.

In response to some of the tensions mentioned, some scholars advocate for a balanced approach that integrates both open-book and closed-book formats. Durning et al. (2016), for example, proposed that combining assessment types may offer a more comprehensive evaluation of student competencies by capturing both knowledge recall and applied problem-solving skills. Such hybrid models may also mitigate the risks associated with overreliance on external resources, whether that would be textbooks, online materials, or AI tools, while still supporting students' development of critical thinking abilities.

Beyond formal assessment formats, students' study behaviours are increasingly shaped by digital and social media platforms. Social media has become an integral component of contemporary learning environments, offering spaces for peer collaboration, resource sharing, and academic discussion. Research by Junco, Heiberger and Loken (2010) demonstrates that students who use social media for academic purposes tend to exhibit higher levels of engagement and improved academic performance. Platforms such as YouTube, TikTok, and Instagram now host vast amounts of educational content, while online communities on Reddit, Discord, and Facebook provide informal support networks that influence how students prepare for assessments. Understanding the role of these platforms is therefore essential for capturing the full landscape of modern study practices.

Taken together, these developments highlight the need for a comprehensive examination of students' perceptions of assessment types, their engagement with AI tools, and their use of social media in academic contexts. This research project aims to address these issues by exploring student perceptions and attitudes toward the transition, how they navigate the opportunities and challenges posed by AI technologies, and how social media shapes their preparation strategies. By investigating these interconnected themes, the study seeks to contribute meaningful insights to ongoing discussions surrounding assessment design in higher education. Ultimately, the findings may inform pedagogical approaches that balance academic integrity, student wellbeing, and the development of essential cognitive and professional skills.

Methodology

Initiation of the project

The student research team was built from the School of Life Sciences, Pharmacy and Chemistry from the following courses: Biomedical science, Biochemistry and Biological Science courses (All levels). Six students were selected. The students recruited were four final year Biomedical Scientists, and two second year students, one Biomedical Scientist and one Biochemist. Before the start of the project, full ethical approval was obtained from the Kingston University CHERP (Centre for Higher Education Research & Practice).

Institutional Assessment Context

Students within the School of Life Sciences, Pharmacy and Chemistry are exposed to a diverse range of assessment strategies across Levels 4, 5, and 6. To ensure a clear comparison between formats, the specific assessment types experienced by the participants are categorised as follows:

Closed-book Assessments: These are typically high-stakes, invigilated, or strictly timed formats. They include portfolios of MCQ assessments and computer-based MCQ and SAQ assessments, both of which are limited, timed sessions. Additionally, students complete case study-based assessments, closed-book formal exams, and practical-based assessments (e.g., laboratory competencies).

Open-book Assessments: In our school, open-book refers to both timed and extended formats. This includes in-class tests where students are permitted limited handwritten notes and portfolios of MCQs (limited timed assessment). It also encompasses broader formats such as practical-based assessments, workbook-style assessments (prepared over several weeks), and long/short reports completed over extended periods.

While the general assessment framework is consistent across the school, the specific frequency and weighting of these formats vary by module and level of study. However, all surveyed students in levels 4, 5, and 6 have had direct experience with at least one form of both open-book and closed-book assessment before completing the questionnaire. This study specifically evaluates student opinions and perceptions based on these established institutional practices.

Paper based Questionnaire: A paper-based questionnaire was planned, designed and built collectively between student and staff researchers to address the question of which assessment type was beneficial, and which is detrimental to the student university experience. The questionnaire was divided into three main sections. Section 1 obtained student demographics with questions including: Gender, age, ethnicity, course of study, level of study and entry qualifications. Section 2 focused on areas such as participant opinions on types of assessments, if types of assessments affect engagement and confidence, if assessments affect stress levels, creativity in the course and whether AI affects assessments. Finally, section 3 asked two questions on whether blended and visual learning helps in preparation for assessments. Many of the questions were multiple-choice type questions except for three free text questions.

Distribution of questionnaire

Student researchers distributed the questionnaire at core lectures from each year group in the School of Life Sciences, Pharmacy and Chemistry. targeting courses in the departments of Biomolecular Science, Applied and Human Science and Chemical and Pharmaceutical Science. When the distribution of the questionnaire occurred, a participant information sheet (PIS) and consent form was also provided for the participant to read. The PIS provided all key information for the study. As stated in our ethical approval paperwork, participants could withdraw without prejudice at any point from the study.

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Data collation and analysis

Results obtained from completed questionnaires were transferred to a password protected spreadsheet with only access for student and staff partners. The spreadsheet allowed clear analysis of the data. This also allowed percentages to be generated for the subsequent data tables. Free text questions and comments were analysed qualitatively using word cloud-based software to illustrate key themes.

Results

Participant Demographics

A total of 122 respondents completed the questionnaire. Most participants were aged 18-21 years of age, while gender distribution was predominantly female. Course representation was heavily weighted toward BSc Biomedical Science (77%), with smaller groups in the remainder of courses. Ethnic composition included Asian/Asian British (51%), White (17%), Black/Black British (14%), Mixed (7%), and Other (11%). Most participants were in Level 5 (42%) or Level 6 (35%), **Table 1**.

Table 1 Table of various key demographics analysing course, age, gender and ethnicity of participants

Course						
BSc Biomedical Science	BSc Biochemistry	BSc Biological Sciences	BSc Nutrition (Human Nutrition)	Other		
94 (77%)	15 (12%)	8 (7%)	2 (2%)	3 (2%)		
Age			Gender			
18-21 Years	22-25 Years	26+ Years	Male	Female	Non-Binary	PNTS
90 (73%)	30 (25%)	2 (2%)	31 (25%)	87 (71%)	2 (2%)	2 (2%)
Ethnicity						
White	Black/Black British	Asian/Asian British	Mixed	Other		
21 (17%)	17 (14%)	63 (51%)	8 (7%)	13 (11%)		
Which level are you in?						
L3	L4	L5		L6		
1 (1%)	27 (22%)	51 (42%)		43 (35%)		

Preferred Assessment Methods

When participants were asked about their preferred assessment format, online open-book tests were found to be the most popular (41%). When asked if participants were confident presenting their work to their peers and academics, a large majority (54%) said yes. Regarding how knowledge retention worked in their studies, 63% felt they retained material longer after open-book assessments.

Blended learning methods were viewed positively, with 61% agreeing it would help assessment preparation. Visual learning was strongly endorsed, with 89% stating it improved retention **Table 2**.

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Table 2: Table investigating modes of assessment and learning techniques, expressed as numbers and a percentage of total (%). Note: Some students did not respond to all questions.

<i>What is your favourite method of assessment?</i>				
Closed book written exam	Open book written exams	Online test (open book)	Written report	Mixed assessment
8 (7%)	13 (10%)	50 (41%)	7 (6%)	44 (36%)
Are you confident presenting your work in in front of your peers and academics?		Would the use of blended learning (online and on campus learning) help you in your preparation for possible assessments?		
Yes	No	Yes	No	I am not familiar with blended learning
66 (54%)	56 (46%)	74 (61%)	26 (21%)	22 (18%)
Does visual learning help you with retaining the study material better in preparation for your assessments?		You are able to retain knowledge for longer after		
Yes	No	Open-book assessments	Closed-book assessments	
109 (89%)	13 (11%)	77 (63%)	45 (37%)	

Closed-Book Assessment reaction

Opinions on closed-book exams were mixed: 51% considered them a useful method of assessment, yet 67% reported disliking them. Nearly half (48%) wished they were removed from courses.

Stress reduction was a key theme from the responses, 66% felt less stressed if closed-book exams were removed. Time management for closed-book preparation was challenging, with only 38% confident in managing time, **Table 3**.

Table 3: Response table analysing attitudes towards closed-book assessments, expressed as numbers and a percentage of total (%). Note: Some students did not respond to all questions.

<i>What is your opinion on closed book assessments (these include formal examinations and assessments held on campus without notes)?</i>			<i>Are closed book exams a useful method of assessment?</i>		
I don't like them	I like them		Yes	No	
82 (67%)	40 (33%)		62 (51%)	60 (49%)	
<i>Do you feel less or more stressed about your study with a removal of closed-book assessments?</i>			<i>Do you wish closed-book exams were completely removed from your course?</i>		
More stressed	No difference	Less stressed	Yes	Unsure	No
22 (18%)	19 (16%)	81 (66%)	59 (48%)	33 (27%)	30 (25%)
<i>In your opinion are you able to manage your time in preparation for closed-book assessments?</i>					
Yes		No	Not sure		
47 (38%)		40 (33%)	35 (29%)		

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Open-book assessment opinion

The shift to open-book exams was associated with overall positive outcomes: 59% of participants reported greater engagement, 76% felt more confident, and 66% were more motivated to learn in depth. Creativity also improved, with 73% agreeing that open-book formats allowed more time for creative learning, **Table 4**.

Table 4: Table of data analysing student attitude toward open book assessments, expressed as numbers and a percentage of total (%). Note: Some students did not respond to all questions

<i>Replacement of formal written exam assessments with open-book assessments has resulted in what in terms of your engagement level?</i>			<i>Replacement of formal written exam assessments with open-book assessments has resulted in what in terms of your confidence levels?</i>		
More engaged	less engaged	No change in your engagement	More confidence in learning	Less confidence in learning	No change in your confidence
72 (59%)	15 (12%)	35 (29%)	92 (76%)	15 (12%)	15 (12%)
<i>Replacement of formal written exam assessments with open-book assessments has had the following effect on your motivation to learn more in depth about your course</i>			<i>Do you feel that open-book exams have given you more time to be creative in your course and enjoy learning?</i>		
Less motivated	More motivated	No change in motivation	No change	Yes	No
17 (14%)	81 (66%)	24 (20%)	18 (15%)	89 (73%)	15 (12%)

AI use and assessment trends

The adoption of artificial intelligence was moderate: 34% of participants used AI for generating submissions. 87% of participants felt AI had not reduced their engagement levels. Overall, 91% reported a positive experience with the shift in assessment trends, and 88% agreed that problem-based learning enhanced understanding of material, **Table 5**.

Table 5: Table of data analysing student attitude toward AI and shifts in assessment and learning, expressed as numbers and a percentage of the total (%). Note: Some students did not respond to all questions.

<i>Do you use AI to help generate your submissions for assessment?</i>		<i>Has the use of AI made your overall engagement with assessments less?</i>	
Yes	No	Yes	No
42 (34%)	80 (66%)	16 (13%)	106 (87%)
<i>Are you having an overall positive experience with the shift in trend of assessments?</i>		<i>Has problem-based learning allowed you to develop a more thorough understanding of the study material?</i>	
Yes	No	Yes	No
111 (91%)	11 (9%)	107 (88%)	15 (12%)

Qualitative data

Students who attended focus groups were asked two key questions:

1. How do different types of assessments impact your learning and understanding of the material?
2. How do you feel about the feedback you receive on your assessments?

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For the first question, positive comments involved mini formative quizzes, presentations, case studies and essays, with negative responses focused on closed book assessments, **Table 6**.

Table 6: Qualitative data responses to free text question: 'How do different types of assessments impact your learning and understanding of the material?'

Open question	Comments
How do different types of assessments impact your learning and understanding of the material?	Positive 'I love mini formative quizzes as they give feedback, and you can then improve' 'Presentations are enjoyable, and you learn how to use different digital platforms for example Canva and adobe which enhances your technical skills' 'Case studies allow you to use application and improve skills applying it to real scenarios/real life' 'Essays help you think critically and how to answer questions in depth' Negative 'Closed book exams result in more stress, and you don't receive feedback for them' 'In class assessment (closed book) means you have to learn everything for that one assessment and it's not a true representation of your abilities'.

For the second question, feedback helps with improvement for the next assessment, identification of strengths and weaknesses and interestingly, feedback is only being looked at when a low grade is achieved, **Table 7**.

Table 7: Qualitative data responses to free text question: How do you feel about the feedback you receive on your assessments?

Open question	Comments
How do you feel about the feedback you receive on your assessments?	'I Appreciate the feedback to see what went well and how to improve for next time (a learning curve) 'Feedback Identifies strengths and weaknesses so I can tailor my revision and progress' 'I only look at feedback when I get a low grade so then I can apply feedback for other assessments' 'For scientific essays you get really good feedback as they go into depth of each part or sentence/mistakes and go into intricate detail, so it is very helpful for future assessments'

Discussion

Reflection on assessment preferences, confidence, and retention

The findings of this project illustrate that students feel they retain knowledge longer after open-book assessments than after closed-book examinations. This perception complements evidence from previous research: repeated testing enhances retention relative to just repeated study (Roediger and

Karpicke, 2006). In this finding, students report better retention with open-book assessment, can be explained by recognising that many open-book formats can be designed to incorporate retrieval, application, and synthesis, thereby combining testing effects with authentic problem-solving (Roediger and Karpicke, 2006; Durning et al., 2016).

Critically, the link between these student preferences and meaningful learning extends beyond simple favourability; the formats students prefer are those that require the highest levels of cognitive engagement. Qualitative data from our focus groups (**Table 6**) highlights that students specifically value mini-formative quizzes, presentations, and case studies because they provide actionable feedback and situate learning in real-world applications. Rather than encouraging the surface-level engagement often feared by critics of open-book formats, these preferred assessments facilitate deeper understanding by requiring students to apply, analyse, and synthesise information in ways that mirror professional contexts. This is further evidenced by the 88% of participants who agreed that problem-based learning (PBL) enhanced their understanding (**Table 5**), suggesting that student's preferences are closely aligned with assessments that promote situational learning and critical thinking rather than mere knowledge recall.

Confidence and motivation are also materially shaped by assessment design in our observations: the move to open-book was associated with greater confidence and more motivation to in depth learning.

Research on anxiety during tests suggests that high-stakes, time-pressured formats can compromise performance and wellbeing, supporting students' desire to reduce reliance on stressful closed-book exams (Putwain, 2008a; Putwain, 2008b). Accordingly, programme-level assessment strategies should consider stress-sensitive design, balancing necessary points of secure judgement with opportunities for supported learning which ensures retention and enhanced attainment.

Engagement, creativity, and learning design

The positive results in engagement and creativity and enjoyment associated with open-book assessments from our participants correlate with research on active learning, which reliably increases examination scores and reduces failure rates across STEM disciplines (Freeman et al., 2014). Open-book and online problem-based tasks can be orchestrated to promote analysis, collaboration, and metacognition, functioning more as learning experiences than just assessments assessing regurgitation of knowledge (Durning et al., 2016; Freeman et al., 2014).

Participants in our study also strongly endorsed visual and blended learning to support preparation signalling a broader appetite for multimodal resources that scaffold understanding and reduce cognitive load during revision. In practice, this implies pairing open-book tasks with structured preparatory activities (e.g., formative quizzes, case studies, and reflective prompts) that align with active-learning evidence and promote transfer to assessment contexts (Freeman et al., 2014).

The role of AI and problem-based learning in assessment

AI use in our participants was moderate (34%), and the majority reported that AI had not reduced engagement. International guidance emphasises that assessment should now explicitly address AI-rich realities, foregrounding ethics, transparency, and appropriate engagement with AI while maintaining trustworthy judgements of learning (Lodge et al., 2023). UNESCO similarly advocates human-centred, age-appropriate, and ethically grounded integration, with clear policy frameworks and institutional validation of AI tools (UNESCO, 2023). Sector guidance stresses the need for explicit declarations of AI use, clarity on malpractice, and robust processes to authenticate student work (JCQ, 2025).

In our data, 91% reported a positive experience with the recent shift in assessment trends, and 88% agreed that problem-based learning (PBL) improves understanding. This aligns PBL with the direction

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of authentic assessment in an AI era, emphasising process, judgement, and contextual decision-making rather than unmediated product generation (Lodge et al., 2023).

Qualitative insights and student voice

Focus group responses highlighted formative quizzes, presentations, and case studies as particularly valuable types of assessment because they provide feedback, foster technical and communicative skills, and situate learning in real-world applications. Criticism of closed-book exams is centred on stress and limited feedback. These themes mirror previous pedagogic research which suggests we design assessments that drives learning behaviour constructively and supports inclusive practice across diverse cohorts (Heijne-Penninga *et al.*, 2008; Stentiford and Koutsouris, 2022).

Implications for assessment strategy

Taken together, our findings direct us to advocate for programme-level assessment structures that:

- Prioritise authentic, open-book and mixed formats where students must integrate and apply knowledge with resources.
- Embed active learning in preparatory teaching (e.g., formative testing, case-based seminars, visual/blended resources).
- Integrate AI literacy and ethics into assessment instructions and marking criteria, requiring transparent declaration and process evidence.

Conclusion

Our findings do derive from a single-institution sample (N=122) and rely on self-reported perceptions of retention, confidence, declaration of AI usage and engagement. Future work should triangulate these perceptions with performance data, item-level analyses (e.g., application vs recall), and wellbeing measures (test anxiety, cognitive load), while evaluating how assessment redesign interacts with AI policies, and more importantly discipline-specific accreditation requirements (which for some courses state specifically that assessments must be closed book examinations) (Putwain, 2008a, Putwain, 2008b; Lodge et al., 2023).

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