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Critical by design: how learner modes impact the propensity to think critically

James Blackmore-Wright
University of Birmingham, UK

Abstract

Demonstrating the ability to think critically is a common requirement of Higher Education (HE) assessments, bridging disciplines and forming a significant part of the feedback given to students. Despite its prominence, more can be learned about how different learner modes influence the propensity to use critical thinking. This article reports on the results from a study of critical thinking in a global MBA programme that compared how online, and on-campus environments influenced a learner's approach to problem-solving and decision-making. A survey instrument was administered to two cohorts, studying online and on-campus, who were taking an identical module in strategy. Whilst differences in learning experience were to be expected, the degree to which learner modes affected the propensity to think critically was surprising. On most measurements, on-campus learners outperformed their online counterparts. The results, interpreted through the lens of Administrative Behaviour Theory, demonstrate that learner modes should be treated as separate entities, and that a homogenous approach to digital and physical learning strategies may prove ineffective. The implications of the results are discussed, including recommendations for learning designers.

Keywords: critical thinking; learner modes; curriculum design; higher education; assessments; MBA.

Introduction

Critical thinking is an active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends (Dewey, 1910, p.74).

It has been over a century since Dewey (1910) laid the foundations for criticality being both an outcome and enabler of effective education, yet the need for students to possess greater clarity of thought remains compelling even today. Whilst much has changed in HE, a notable development has been that an age of misinformation is upon us, one that is characterised expertly by O'Connor and Weatherall (2019, p.266) as being a 'battle between truth and opinion'. Whilst this 'battle' may not be a new phenomenon, it is increasingly relevant for students of business, as managers and organisations seek to make better decisions in an unpredictable environment, whilst dealing with both uncertainty and ambiguity.

Graduates find themselves entering a highly competitive employment market, where firms place great emphasis on effective management problem solving and decision-making. Prior to graduation, students are presented with assessments that are becoming more practice-orientated, and are exposed to multiple models, theories, and industry knowledge. The depth and volume of information available to students presents a significant challenge, and they need to be provided with the tools and training in order to be objective when approaching data. The volume of data, after all, is increasing exponentially (Huadong, 2017) and the rise of artificial intelligence systems will continue to present significant obstacles to an objective and critical examination of evidence (Kertysova, 2018). These factors stress the need for students to be able to navigate complex situations, and for learning designers to be cognisant of how different environments affect the propensity for critical thinking.

The ever-changing business landscape also affects the business school itself, from technological developments to calls for an overhaul of the curriculum. Socially responsible practices, for example, should play a more visible role in universities (Azmat et al., 2023), although what actually constitutes responsible behaviour is widely debated, and with some contrasting views (Latapí Agudelo at al., 2019; Licandro et al., 2023). There is a danger that business schools may become fixated on *what* to teach instead of *how* it is taught. Embedding critical thinking in business and strategy teaching is therefore essential, as making better decisions will benefit graduates and recruiters alike.

In a higher education context, a learning designer plays an essential role in designing and facilitating high-quality learning experiences for students; whilst this may be a specific role that collaborates with faculty and instructional technologists, it is often the module leader that has responsibility for shaping assessments and content, that complement the course learning outcomes. This reflects the environment in the business school programme that features within the study, where teaching staff have consistently been responsible for shaping what is taught, and how it is assessed.

Although online and face-to-face programmes may effectively cover similar content, a leading MBA programme expressed concern that an assumption that uniform critical thinking abilities and requirements among students in both learner modes might not hold true. The study, discussed in this paper, was initiated to question, and investigate this assumption. Should there be the same expectations for both sets of learners? If teaching critical thinking could be optimised, this would benefit learners, teaching staff, and businesses alike.

From a business perspective, effective business performance hinges on the quality of management decisions and identification of challenges and opportunities in dynamic markets, as poor decisions can result in strategic failures (Dean and Sharffman, 1993; Vera and Crossan, 2005; Hammond et al., 2006; Rogers and Blenko, 2006; Homburg et al., 2008; McMillan and Overall, 2017). This underlines the importance of educational programmes that support critical thinking skills, and the risks of having none.

Critical thinking and MBA education

Whilst critical thinking does not enjoy a singular definition, Dawson (2008) captures its essence as being a process of "thinking about thinking". By comparison, Tittle (2011, p.4) aptly describes it as 'judicious reasoning about what to believe and, therefore, what to do. It is a multi-dimensional skill and something that you get better at, gradually, with practice'. It manifests itself as a disposition, urging individuals to become intentional and deliberate in their actions, guided by a logical approach. Once a problem has been recognised, a sequence of objective inquiry, reflection and information synthesis ensues, leading to well-informed decisions (Richards et al., 2020). These perspectives reflect the approach that tutors adopted in the strategy module under consideration in the study, and compelled

students to follow. Whilst a standard definition does not exist, and neither is sought, the article adopts the position of programme tutors that critical thinking occurs when there is an active, objective, and scientific line of inquiry taken.

Leading MBA programmes have the development of *effective* decision-making as a key part of their course content, showing that efficient, not rushed, decisions *matter* (Blackmore-Wright, 2021). When this happens consistently in a business, it can lead to a competitive advantage being gained and fewer opportunities missed (Eisenhardt, 1988; Souitaris and Maestro, 2010).

As previously stated, the business landscape is undergoing considerable change, and MBA programmes are also impacted. Online MBA provision has enjoyed growth in terms of suppliers, student numbers and technology provision. Statistics show a 30% outstripping of face-to-face and blended offerings by online MBA programs in 2020, and an 80% growth from 2012 to 2018 (Bisoux, 2022). The trajectory of change has persisted, and it would be difficult to argue that this is a temporary shift. The COVID-19 pandemic further catalysed this growth, witnessing the number of providers more than double between 2012 and 2022. Research into online MBA programmes have largely focused on the convenience to learners (Rydzewski et al, 2010; Neuman and Briggs, 2022), with a gap and requirement for more comparative analyses between online and on-campus learners from a pedagogical standpoint. It is a crucial area of concern.

Learning design

As the business landscape has experienced significant change, there is an argument that MBA learning designers should be more cognisant of how changes in delivery, in particular the expansion of online learner modes, impacts on module design (Goodyear, 2020). The learning environment is continually evolving and has a significant role to play in shaping the student experience; the ambience of the learner mode, the availability of tools, systems and activities that shape interactions, all potentially negatively or positively impacting on the ability to think critically (Closs et al, 2022). There have been calls for learning designers to create environments for authentic learning, one in which knowledge be put to use straight away, and prioritise learner needs ahead of the production of 'content' (Salmon and Wright, 2014).

Technology has been of the biggest drivers for shaping learning experiences, enhancing mobile learning, distance learning and blended learning (Chung et al., 2022), yet the traditional lecture series still dominates, and that was the case within the study. Whilst there have been calls for the 'traditional' lecture to be reimagined or abandoned altogether (Nordmann et al, 2021), this article does not call for the prioritisation of any method, moreover, it calls for a deeper consideration of the learner mode at the outset of the design process.

More than 100 years after Dewey highlighted the importance of active participation in thinking, his work continues to be relevant.

Background

The importance of thinking critically permeates all aspects of HE, this article reports on the results from a study into a global MBA programme, and includes material derived from the author's doctoral research (Blackmore-Wright, 2021). Whilst future research may be extended to multiple programmes and disciplines, the MBA was selected due to its structure, content, and student expectations. Module assessments made clear requests for students to demonstrate critical thinking, whilst the opportunity to enhance problem-solving and decision-making skills, featured prominently as a motivating factor for students applying to the programme.

Historically, a generic approach to module and assessment design had been taken across learner modes. The online module in strategy represented a 'digital version' of the on-campus module, with content, curriculum and assessments being identical. Discussions with teaching staff and feedback from external examiners highlighted concerns about whether such a generic approach disadvantaged students from one learner mode over another. This feedback, along with a lack of knowledge regarding whether learner modes were helping or hindering students, acted as the catalyst for an exploratory study. Background information into the exploratory project now follows, as it provided the foundations for the research questions for the study.

Exploratory project to evaluate MBA critical thinking

Whilst it was recognised that critical thinking was a pivotal part of the learning experience, it was clear to MBA teaching staff that its value, and how often it was demonstrated in practice, was subjective. No measurement process existed, presenting a significant challenge. If teaching staff were unable to measure the impact of a key skill, and develop an optimal environment for learning, how could students improve? The notion of improvement was complicated further still by how teaching staff viewed feedback they provided on assessments, with one remarking that 'we are saying the same things to students about being critical now that we were saying 5 years ago, nothing changes'. Indeed, the volume of developmental feedback seemed high, with seemingly little impact on results.

To explore these issues more deeply, an exploratory project was commissioned to examine feedback provided to a key student segment (MBA students studying a module in strategy), so that it could be measured and analysed objectively.

Assessment feedback is an immensely powerful tool, but it requires planning and preparation by educators to embed it effectively within programmes (Morris et al., 2021). Whilst it can play a key role in how students develop their learning skills, it should not appear in isolation; effective feedback must consider communication methods, cohesion with training plans and be participatory (Evans, 2013). A key objective of the exploratory project was to identify if common areas of feedback existed and, if so, whether targeted interventions (training and coaching) may be required.

A qualitative content analysis of all assessment feedback, both summative and formative, given to MBA students over a three-year period leading up to the study was conducted. The sample comprised students studying both online and on-campus. The curriculum and assessment structure were identical for each learner mode, enabling a robust dataset to be compiled and compared. The content analysis identified a dominant theme: the biggest barrier to increasing academic performance was (a lack of) critical thinking skills.

This observation presented an intriguing opportunity to delve deeper into the factors that might impede student progression in this area, whilst also addressing concerns that students engaged in online learning may experience disadvantages due to limited access

to skills development resources. To aid in the categorisation of data, the Watson-Glaser appraisal, a widely utilised and scrutinised test of critical thinking (Bernard et al., 2008), was adopted as a framework. The appraisal was developed in the 1930s, and has been subsequently revised and updated, and is also a key determinant for graduate entry into law school (Possin, 2014).

Table 1 summarises the results of the exploratory project, highlighting how much of the overall feedback provided to students relates to improving critical thinking and, specifically, to the five subsets of the Watson-Glaser appraisal: inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments.

Table 1. Exploratory project feedback summary.

Descriptor (Watson-Glaser)	Coverage OC (On Campus)	Coverage OL (Online)
Deduction	9%	14%
Inferences	13.4%	16.7%
Recognition of assumptions	12.2%	15.4%
Interpretation	11.1 %	14.9%
Evaluation of arguments	19.3%	22.7%
Total (as a % of all feedback provided)	65%	83.7%
GPA	3.75	3.25

Assessors worked across both learner modes and were guided by identical marking rubrics and assessment criteria. The grading history of each assessor was reviewed to ensure that the level of feedback provided in the module was not out of the normal range, and that any biases towards a specific learner mode would be identified. The exploratory work clearly demonstrated that more requests to improve levels of critical thinking were provided to those students studying online. Academic performance, taken as an average of the grade point average (GPA) was better for on-campus students. This disparity helped formulate the research questions (RQs) for this study:

RQ1. Does the learner mode affect the propensity to develop and deploy critical thinking skills?

RQ2. Is a generic approach to learning and assessment design effective for both on-campus (OC) and online (OL) learner modes?

This article intends to highlight the risks of a generic approach to online/on-campus learning and teaching design, providing insights that can inform educational practice and contribute to the overall improvement of student performance.

Methodology

If there were no limits to human rationality, administrative theory would be barren. It would consist of the single precept: always select that alternative, among those available, which will lead to the most complete achievement of your goals. The need for an administrative theory resides in the fact that there are practical limits to human rationality, and that these limits are not static, but depend upon the organisational environment in which the individual's decisions take place, the task of administration is so to design this environment that the individual will approach as close as practicable to rationality (judged in terms of the organisation's goals) his decisions (Simon, 1976, p.322).

Administrative behaviour theory

From early years tuition to HE, there are demonstrable links between a student's learning environment and their academic performance, (Lizzio et al., 2002; Barrett et al., 2015; Kweon et al., 2017; Caprara and Caprara, 2022), thus accentuating the importance of adapting learning and teaching provisions to specific environments. Echoing Simon's (1976) seminal work, the study considers whether the organisational environment affects the propensity to think critically and influences grades. Whilst Administrative Behaviour Theory is not routinely applied to pedagogical research, it has made impressive contributions across the wider Management Sciences and influenced work on the rationality of decisions and organisational improvement (Chandler, 1962; Ansoff, 1965; Channon,1973; Steiner and Dorff, 1980). The opportunity to view decision-making through an environmental context, identify why critical thinking might be restricted, and understand how best to construct an organisation in order that it may achieve its goals with greater efficiency (Simon, 1997), justified its suitability as the theoretical framework for the study.

Simon (1976) conceptualised the 'economic' manager, one who makes rational decisions in order to achieve a specific goal, and who selects the best alternative from those available to them. It is this type of behaviour that reflects the actions of students seeking to maximise their use of critical thinking. The antithesis is the 'administrative' manager, who 'satisfices', or does only what needs to be done. This is a thinker who is likely to oversimplify situations, reflecting Simon's (1976) view that a decision-maker will always be constrained by the limits of their own intelligence and how motivated they are to approach difficult situations.

This study is concerned with how students think, and how they approach assessments requiring objective problem-solving and critical decision-making. By extension, it explores whether an 'economic' or 'administrative' approach is more likely to reside in one of the learner modes, helping to explain whether learner modes have a positive or negative impact on the development of critical thinking, potentially amplifying or diminishing any benefits provided by the MBA programme. The hypothesis, therefore, concerns whether students are 'bounded' by their learning environment.

The null hypothesis for the study:

HO: There will be no significant difference in the propensity for students to learn and deploy critical thinking skills between OC and OL. This is tested against the alternative hypothesis:

HA: There is a significant difference between the propensity for students to learn and deploy critical skills between OC and OC.

In order to test the HO, a survey was administered to MBA students, across two learner modes, in a Russell Group Business School. Written consent was obtained from all participants and the project received approval from the University of Birmingham Research Ethics Committee. The survey was designed to evaluate the propensity to think critically, in the context of the learner mode. The need to understand thinking within this specific context ruled out the use of the Watson-Glaser appraisal tool, which had helped to establish the categories for the exploratory study. Questions elicited information regarding how their learner mode helped or restricted their ability to think critically in a number of

situations. Both groups of students (OC and OL) were undertaking an identical, strategy-orientated module. Because of the accessibility of the overall population, a simple sampling approach was utilised. All students were presented with the opportunity to complete the survey; from a total population of 307 MBA students, 186 participated in the survey (N=186, OC=101, OL=85). This is representative of the size of postgraduate taught programmes in the institution. Both cohorts have access to the same level of support and resources, albeit online learners experience more virtual delivery. It is noted that a smaller cohort size or different programme may present greater differences in respect of resources, which may be a consideration if the study is expanded to evaluate different programmes.

Survey instrument design

The survey instrument was designed to evaluate the propensity to learn and deploy specific critical thinking skills, reflecting the developmental areas identified in the content analysis of the exploratory study, the concepts that emerged from the review of literature, assessment criteria and tutor feedback. It was concluded that in order for a student to think critically and perform at an optimal level, they would need to: prepare for a decision-making situation, question scientifically, analyse data objectively, synthesise information, reflect on decision-making, rationalise information and strive to achieve optimal results (i.e., not satisfice).

The survey contained two questions per measurement area (shown in Table 2), consisting of 14 questions overall, asking students to consider how likely they were to develop and deploy these skills in the context of their learner mode.

Table 2. Survey measurement areas.

Measurement (M) Area	Description
M1	Propensity to *prepare* for a decision-making situation.
M2	Propensity to *question* scientifically.
M3	Propensity to *analyse* data objectively.
M4	Propensity to *synthesise* information to make informed decisions.

M5	Propensity to *reflect* on decision-making.
M6	Propensity to *rationalise* information.
M7	Propensity to *satisfice.*

A 7-point Likert scale was utilised, due to the level of accuracy that it offered and the ease of use for participants (Taherdoost, 2022). The data was subsequently analysed in SPSS 27, where no significant outliers were found, and was successfully tested for normality using the Shapiro-Wilk test. Prior to administering the survey, a thorough pre-testing was conducted, with a focus group of MBA alumni from across both learner modes. This group comprised recent graduates (one year) who had experienced both on-campus and online learning in the MBA and offered a broad range of backgrounds and experiences. A 50/50 ratio of female to male participants offered no issues regarding gender imbalance. Cognitive pretesting is recognised as an effective approach for ensuring greater validity and consistency is achieved (Hilton, 2017).

The purpose of delivering a focus group of this type was to ensure that respondents from various backgrounds understood the questions in a consistent way. The results were surprising. Whilst there were no recorded problems with comprehension, discussions revealed that graduates who had studied online had experienced more negative experiences with critical thinking, than those who studied on campus. Focus group participants who had studied online reported that much less time was spent on collaborating with peers and that they felt less able to question and challenge information in online forums.

Findings and Discussion

The various means and standard deviations of responses from OC and OL, and the results of a paired samples t-test, are shown in Table 3. An analysis of the means indicates that OC students show a greater propensity to learn and deploy critical thinking skills, considering measurement areas M1 to M5. There was a significant difference in the scores from Q2 (M1) that assessed the 'propensity to prepare adequately for a decision-making situation'. The results of OC (M=3.31, SD=1.37) and OL (M=2.74, SD=1.19) show a much greater likelihood that on-campus students will make advanced preparations for workshops and lectures. Similarly, there was another, significant difference in the scores of

Q3 and Q4 (M2), that assessed the 'propensity to question data/situations scientifically'. Here, OC (M=3.39, SD=1.35 and M=3.10, SD=1.44) and OL (M=2.82, SD=1.18 and M=1.6, SD=0.92) show a greater likelihood that on-campus students will adopt a scientific method to solve problems.

Whilst the majority of measurements indicate a greater likelihood of on-campus students embracing critical thinking, there is, however, a reversal for measurements M6 and M7. The results for Q11, concerning the propensity to utilise logic show a significant difference between OL (M=2.58, SD=1.37) and OC (M=1.68, SD=0.84). Questions 13 and 14, concerning the propensity to reflect the attributes of Simons (1976) 'economic', instead of 'administrative' approach, show more significant differences between OL (M=3.25, SD=1.34 and M=4.07, SD=1.22) and OC (M=1.87, SD=1.03 and M=2.99, SD=1.15). A coefficient of variation of 0.42 shows that the data is clustered closely around the mean. The paired sample *t*-test supports H1 and indicates that OC (on-campus) demonstrates a greater propensity to learn and deploy critical thinking skills than counterparts in OL, given the statistically significant results across M1 to M5.

Results show that students in OL show greater propensity to both rationalise information and to satisfice. This reflects the level of feedback given to students, as indicated by the content analysis in the exploratory project. An 'economic' approach is more likely to be seen on campus, whilst an 'administrative' is more likely to occur online. Based on the analysis, critical thinking may be framed as an active way with engaging with evidence to make informed, objective, and effective decisions. The propensity to think critically is influenced by the environment in which the decision-maker is situated.

Table 3. Mean, standard deviation, and t-test.

Survey question	Measurement area	LM	N	Mean	Std Deviation	T (df)	P (sig)
1	M1	OC	101	2.8119	1.10193	184	.150
		OL	85	2.6353	1.21349		
2	M1	OC	101	3.3059	1.37168	184	0.02
		OL	85	2.7426	1.18878		
3	M2	OC	101	3.3882	1.34602	184	<0.01
		OL	85	2.8199	1.18079		

4	M2	OC	101	3.0099	1.14451	184	<0.01
		OL	85	1.6000	.91548		
5	M3	OC	101	2.9982	1.4837	184	0.027
		OL	85	2.6238	1.14762		
6	M3	OC	101	2.901	1.2042	184	0.033
		OL	85	2.553	1.3584		
7	M4	OC	101	2.9647	1.10641	184	.222
		OL	85	2.9505	1.14347		
8	M4	OC	101	3.3529	1.38621	184	<0.01
		OL	85	2.5149	1.14555		
9	M5	OC	101	2.9604	1.14822	184	0.010
		OL	85	2.5294	1.35038		
10	M5	OC	101	3.4588	1.51621	184	.061
		OL	85	3.1584	1.12011		
11	M6	OC	101	1.6832	.83583		
		OL	85	2.5765	1.37474	184	<0.61
12	M6	OC	101	3.1188	1.12505		
		OL	85	3.7412	1.20666	184	<0.01
13	M7	OC	101	1.873	1.03599		
		OL	85	3.2471	1.34435	184	<0.01
14	M7	OC	101	2.9880	1.15453		
		OL	85	4.0732	1.22324	184	<0.01

The objective of the study was to evaluate the impact of learner modes on a student's propensity to develop and deploy critical thinking skills, and a clear distinction can be made between OC and OL. The results show that OL students are more likely to seek an outcome that is 'satisfactory' and that OC students are more likely to seek optimal solutions, developing and deploying critical thinking skills, thus addressing RQ1. Any assumption that all students are seeking optimal results should be challenged, and assessments be tailored as much as possible to the individual, whilst considering the learning environment.

The MBA is designed to be a programme of collaboration, with opportunities for students to engage with a variety of services beyond that of lectures and workshops. There are

careers teams, student societies and social events that are more accessible to students studying on-campus. Online students, on the other hand, have considerably fewer opportunities for interaction than their on-campus counterparts. Whilst students studying online are able to interact with each other and faculty, it is recognised that time constraints, connectivity and timeframes do provide *barriers* to access. Online students are more likely to be based overseas and work in multiple time zones. There may be a 'boundedness; about their environment which may push them to 'satisfice'. Module tutors observed that online students spent considerably more time communicating via discussion boards, online tools that generate lengthy discussions and ideas about a number of topics. In the module in question, most discussions concerned assessments. As explained by Simon (1976, p.31), 'satisficing occurs in consensus building when the group looks towards a solution that everyone can agree on, even if it is not the best'. The online environment may, therefore, act as a conduit for consensus building, providing a greater level of boundedness to those who are there.

The impetus for the study was the overwhelming level of developmental feedback given to students regarding their ability to think critically. The results clearly demonstrate that learner modes have a markedly high bearing on how students approach problems and make decisions. Learner modes, despite their importance, did not feature highly in the design phase of the module. Assessments, course content and teaching plans were generic for the module. The study has shown that there is a risk in adopting a 'one size fits all' approach to module design and that the MBA should not be viewed as a homogenous programme. Two sets of students (from two different learner modes) taking an identical module demonstrate that approaches to problem solving and decision-making will be different. MBA directors and learning designers should consider tailoring module specifications and assessments towards each specific learner mode. It is unlikely that what 'works in the classroom' will 'work' in the digital space; numerous factors must be considered when designing digital learning environments, from barriers to digital adoption to disruptive technologies (Crittenden et al., 2019). The correlation between GPA and propensity to think critically merits further investigation; it would be valuable to explore whether results are comparable in different disciplines, and whether the apparent disadvantage (GPA) is repeated in other online versus on-campus comparisons.

Acknowledgements

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Author Details

James Blackmore-Wright is an expert in leading high-performance teams and international businesses. With a robust background in learning and teaching design, he researches the intersection of critical thinking and the effectiveness of management education. His work focuses on enhancing educational practices to foster critical thinking skills, preparing leaders for the complexities of modern business environments.

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