

When Classrooms Go Digital: A Critical Examination of Online and Face-to-Face Learning in Contemporary Higher Education

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Abstract: Teaching and learning have never been settled affairs, but the last decade has forced the conversation about how and where they happen into territory that is genuinely new. Institutions that once built their identities around campuses, timetables, and face-to-face instruction now operate in a world where digital delivery is not an experiment but an expectation. This paper examines what that shift means in practice, focusing on two questions that sit at the centre of most institutional planning discussions. The first is about who gets served: how online and face-to-face learning differ in their capacity to accommodate diverse learners and remove the barriers that keep people out of higher education. The second is about money: what it actually costs to run each modality, how those costs behave as student numbers grow, and which approach produces stronger financial returns when real resources are committed over time. The paper works entirely from secondary sources, drawing on peer-reviewed studies, institutional research, and policy analysis published between 2018 and 2025. What emerges from that evidence is a picture that rewards neither enthusiasm for online learning nor nostalgia for the classroom. Online delivery offers genuine and substantial advantages in flexibility and long-run cost efficiency, but only when the investment in quality is serious and the digital conditions available to students are adequate. Face-to-face instruction holds its ground in contexts that require embodied presence, where cohort sizes are too small to justify the upfront costs of premium online development, or where the learner population lacks reliable connectivity. The Contextual Innovation Performance Model (CIPM), advanced by the author, runs through the analysis as an organising framework, insisting throughout that what works depends on where, for whom, and with what resources it is attempted.

Keywords: Online Learning, Face-to-Face Instruction, Learner Flexibility, Educational Access, Cost Efficiency, Scalability, Blended Learning, Higher Education Economics, Contextual Innovation Performance Model (CIPM)

1. Background to the Research

1.1 Introduction

There is a particular irony in the fact that one of the most pressing debates in contemporary higher education concerns a question that is, at its core, ancient. People have been arguing about the best conditions for learning at least since Socrates walked the streets of Athens asking inconvenient questions. What has changed is not the question but the stakes attached to answering it badly. When an institution makes a significant error of judgement about whether and how to shift its teaching online, it does not simply inconvenience a cohort of

students. It commits public money, damages its reputation, and in some cases excludes the very people it set out to serve.

The COVID-19 pandemic accelerated a transition that was already underway, but it did so in a way that stripped away most of the careful planning that responsible change management requires. Institutions that had spent years building digital infrastructure and training staff found the enforced shift manageable. Those that had not found that their improvisations revealed the difference between online learning and emergency remote teaching, a distinction that matters considerably more than the terminology suggests (Means et al., 2020). The pandemic years were, in this respect, an inadvertent large-scale experiment in what online learning looks like when it is done well and when it is done in a hurry. The findings are still being worked through.

This paper enters that ongoing reckoning through two analytical lenses. The first concerns flexibility and access. These are terms that appear together constantly in discussions of online learning, often as though they are interchangeable. They are not. Flexibility is about whether a learning environment can accommodate the varied circumstances of students' lives. Access is about whether structural barriers prevent certain groups from participating in the first place. An online programme can score highly on one of these dimensions and very poorly on the other, and treating them as the same concept leads to policy decisions with consequences that their architects rarely intended.

The second lens concerns cost and scalability. These are perhaps the most consequential dimensions of the modality debate for institutional decision-makers, and they are also among the least clearly understood. The economics of online and face-to-face delivery are structured by a fundamental asymmetry that shapes everything downstream of it, and understanding that asymmetry is essential for any institution trying to decide where its resources should go. The Contextual Innovation Performance Model (CIPM), advanced by the author, runs through both analytical strands as an integrating framework, keeping the analysis grounded in the recognition that institutional performance is always produced by the interaction between a strategy and the conditions in which it operates.

1.2 Problem Statement

The gap this paper addresses is not primarily a gap in the descriptive literature. There is no shortage of studies comparing online and face-to-face learning outcomes, and several recent meta-analyses have synthesised that evidence with considerable rigour. The gap is in how the economic and structural dimensions of modality choice are framed and communicated to the people who have to act on them. Senior leaders in higher education regularly make large investment decisions about digital infrastructure without a clear analytical basis for understanding the cost dynamics involved, the enrolment thresholds at which one modality becomes more economical than another, or the contextual conditions that determine whether those thresholds are achievable.

The conceptual confusion between flexibility and access compounds this problem. When these constructs are conflated, institutions can find themselves investing in online capacity on the grounds that it will widen participation, and then discovering that the populations most in need of wider access are precisely those least able to benefit from online delivery as currently designed. That outcome is not inevitable, but avoiding it requires a clearer analytical framework than the existing policy literature typically provides.

1.3 Research Objectives

Three objectives organise the research.

Objective One: To examine how online and face-to-face learning differ in their structural capacity to accommodate diverse learner circumstances and remove barriers to participation, with particular attention to the analytical distinction between flexibility and access.

Objective Two: To analyse the cost architectures of both modalities, including their fixed and variable cost profiles, marginal cost dynamics, and the institutional conditions under which each becomes more or less economically sustainable as learner numbers grow.

Objective Three: To determine which modality delivers stronger returns when substantial and sustained educational budgets are committed, and to specify the contextual conditions that govern or qualify that determination.

1.4 Why This Study Matters

The practical stakes of getting these questions right are considerable. For institutional leaders, the difference between an evidence-based modality strategy and an intuition-based one plays out over years in the form of financial performance, student satisfaction, and regulatory standing. For policymakers, the question of whether online expansion genuinely widens participation or merely shifts the infrastructure burden onto individual learners has direct implications for educational equity. For curriculum designers and faculty

developers, it determines what kinds of pedagogical investment will actually be possible within the structural framework their institution adopts.

The CIPM contributes to this conversation by insisting on a kind of analytical honesty that generic comparisons of online and face-to-face learning rarely achieve. It does not produce a universal ranking. It produces a framework for reaching contextually specific conclusions, which is what the evidence requires and what practitioners actually need.

1.5 Scope

The paper draws entirely on secondary sources published between 2018 and 2025, with selective inclusion of foundational theoretical texts where their influence on the contemporary literature is ongoing and well-documented. The focus is higher education, though many of the findings apply directly to corporate and professional development contexts. Geographic scope is global, with specific attention to Sub-Saharan African and European contexts where the literature offers particularly instructive contrasting evidence.

2. Literature Review

2.1 Theoretical Foundations

Any serious comparative analysis of online and face-to-face learning needs to begin somewhere in the theoretical landscape of how adults learn, and three traditions are worth establishing before the empirical evidence is examined.

The first is Malcolm Knowles' theory of andragogy. Developed over several decades and consolidated in his 1984 collection, andragogy rests on the observation that adult learners differ from children in ways that carry direct implications for how instruction should be designed. Adults bring prior experience to new learning, they are internally rather than externally motivated, they learn most readily when they can see the practical relevance of what they are studying, and they prefer to take responsibility for directing their own learning when the environment allows it. Online learning, with its structural emphasis on self-paced independent navigation of materials, appears well suited to this profile. Bates (2019) observes this alignment while adding a qualification that the literature has not always taken seriously enough: not all adult learners are self-directed in practice, whatever the theory predicts, and the mismatch between andragogical assumptions and actual learner behaviour is one of the most reliable early-warning signs of an online programme heading toward high dropout.

The second tradition is Vygotsky's sociocultural theory of learning, which approaches the question from a fundamentally different angle. For Vygotsky (1978), learning is inherently social. It happens in the relational space between what a learner can do independently and what they can do with the support of a more capable instructor or peer, a space he described as the Zone of Proximal Development. Face-to-face instruction creates conditions in which this kind of scaffolded social learning can arise spontaneously, through the natural dynamics of a shared physical environment. Online instruction does not create those conditions automatically. It has to build them deliberately, through the design of collaborative tasks, discussion structures, and feedback mechanisms. This is precisely the problem that Garrison, Anderson, and Archer (2000) were addressing when they developed the Community of Inquiry model, which identifies social presence, cognitive presence, and teaching presence as the three interlocking conditions that any effective online learning environment must intentionally construct and sustain.

The third tradition is connectivism, developed by Siemens (2005) and Downes (2012). Their central argument is that digital environments are not simply new containers for established content. They constitute a different epistemological context, one in which knowledge is produced and validated through networked interaction among distributed participants rather than transmitted from a single authoritative source. Connectivism has attracted criticism from scholars who question whether it constitutes a genuinely new learning theory or simply a description of how knowledge circulates across networks. That debate is productive, and it has done useful work in broadening the theoretical lens through which online learning is evaluated, particularly in contexts involving collaborative and inquiry-based approaches where the architecture of interaction matters as much as the content being exchanged.

2.2 Flexibility and Access: Two Constructs, Not One

The conflation of flexibility and access is sufficiently pervasive in the educational literature and in policy discourse to require explicit and sustained correction. These constructs are related but they operate through different mechanisms and they do not always point in the same direction. Treating them as synonymous produces analytical confusion and, more consequentially, policy decisions with unintended distributional effects.

Flexibility, as Collis and Moonen (2001) define it, refers to the capacity of a learning system to accommodate variation among participants: variation in when they study, where they are located, how quickly

they work through material, and what other commitments they are managing alongside their education. By this definition, online learning and particularly its asynchronous variants are structurally more flexible than face-to-face alternatives. They do not require students to be in a specific place at a specific time, and they do not penalise those who have full-time jobs, caring responsibilities, or home addresses far from a university campus. Seaman et al. (2018) document this premium with considerable empirical detail in the American context, where fully online enrolment was driven primarily by working adults whose relationship to fixed-timetable classroom instruction had always been strained.

Access is a different and in some respects harder problem. Tait (2018) defines it as the removal of structural barriers to participation: barriers that can be financial, geographical, physical, cognitive, or technological. Face-to-face learning has well-documented access barriers of its own. Getting to campus has costs, both financial and in time, that many prospective students cannot easily absorb. Fixed timetabling excludes those whose work schedules are inflexible. Physical institutional environments can be socially alienating for first-generation university students or mature returners who do not see themselves reflected in the culture of the institution. But online learning has its own access barriers, often less visible in aggregate statistics but no less real for the learners who encounter them. The International Telecommunication Union (2023) reported that 2.6 billion people worldwide remain without internet access, and that among those who nominally have it, connectivity quality varies enormously by geography and socioeconomic status. In Sub-Saharan Africa, internet penetration rates have grown but remain well below the threshold required for reliable asynchronous learning, let alone high-bandwidth synchronous participation (World Bank, 2023). An institution that shifts from classroom to online delivery without accompanying investment in learner connectivity and digital literacy support may discover it has not widened participation but narrowed it, excluding precisely the students whose circumstances most warranted the shift.

The practical implication is that the question of which modality is more accessible cannot be answered in the abstract. It depends on who the students are, where they are located, what digital infrastructure is available to them, and what level of institutional support accompanies whatever delivery choice is made. The CIPM framework holds these variables explicitly in view, directing analytical attention toward the specific contextual conditions that determine whether a particular modality serves a particular population equitably.

2.3 The Economics of Each Modality

The cost comparison between online and face-to-face learning has been shaped for more than two decades by a structural asymmetry first clearly articulated in the economics of distance education literature. Rumble (2004) identified the essential pattern: face-to-face learning operates on a largely variable cost structure, while online learning exhibits high fixed costs and very low marginal costs. Understanding what this means in practice is the analytical key to the institutional strategy question.

Variable cost structures mean that the cost of instruction rises broadly in proportion to the number of students served. A second face-to-face cohort requires a proportional share of faculty time, classroom space, and support services. A third cohort requires another proportional share. There is no mechanism through which those costs can be substantially reduced per learner as volume grows, short of reducing quality through larger classes, less contact time, or fewer support services. Each additional cohort effectively restarts the cost cycle.

Online learning operates differently. Developing high-quality online instructional materials requires substantial investment before a single student enrolls: instructional design expertise, multimedia production, platform configuration, accessibility compliance, and faculty time spent reconceiving how their courses work in a digital environment. Bates (2019) is direct about the scale of these upfront costs, which are consistently underestimated by institutions that have not done it before. But once that investment has been made, the cost of serving each additional learner is very small. Delivering a well-designed asynchronous module to a thousand students costs little more than delivering it to a hundred. The marginal cost of online instruction approaches zero for asynchronous content delivered through a functioning learning management system.

This cost architecture creates a powerful economic case for online delivery at scale. Jung and Latchem (2011) estimated that well-operated online programmes could achieve per-learner costs of between one-third and one-half of comparable face-to-face provision at sufficient enrolment volumes. The critical phrase, which their analysis handles carefully and which gets lost in many institutional planning conversations, is at sufficient enrolment volumes. At low enrolment, the high fixed costs of premium online content development may never be recovered across the available student base. A specialist postgraduate programme serving twenty doctoral candidates a year is not a candidate for the scalability economics of online delivery. A large undergraduate business programme serving several thousand students annually very much is. The crossover point between the two scenarios is not fixed and universal; it depends on content complexity, production quality standards, and the size of the addressable student market.

A further complication is that the cost advantage of online delivery is only ever real when the quality of the provision is sufficient to sustain learner retention and completion. Low-cost online delivery, built on minimal instructional design, poor multimedia, and inadequate student support, generates dropout rates that erode the per-learner cost advantage and create reputational and regulatory costs that have their own long-run economic consequences (Means et al., 2020). The institution that cuts corners on online quality in the hope of capturing the scalability dividend is likely to achieve neither good economics nor satisfied students.

2.4 What the Pedagogical Research Shows

One of the most durable findings in the comparative modality literature is that the delivery medium is a less powerful predictor of learning outcomes than the quality of the pedagogy deployed within it. This finding has been stable across decades of comparative research and was given systematic empirical grounding by Russell (1999), whose compilation of comparative studies coined the phrase no significant difference to describe the consistent finding that outcomes in well-designed online courses do not differ materially from outcomes in well-designed face-to-face courses. More recent evidence confirms the pattern. The meta-analysis by Means et al. (2020), drawing on over fifty comparative studies across higher education, found that students in online conditions performed modestly better on average than their face-to-face counterparts, an advantage attributable not to the delivery medium itself but to the greater time-on-task and more deliberate self-regulation that well-designed online learning tends to produce.

Several pedagogical approaches have demonstrated consistent effectiveness across both modalities. Problem-based learning, developed by Barrows and Tamblyn (1980), transfers well to online environments when the collaborative infrastructure supporting student interaction is appropriately designed. Walker and Leary (2009) found no statistically significant difference in learning outcomes between online and face-to-face implementations of problem-based learning in higher education, provided that the design quality of the collaborative environment was equivalent. The finding is significant: it is the design, not the room, that determines the outcome.

The flipped classroom model occupies an instructive position in this literature because it is definitionally a hybrid methodology. Content delivery is relocated to pre-class online activity, typically pre-recorded video or assigned reading, and synchronous time is reserved for discussion, application, and feedback. Bishop and Verleger (2013) identified this approach as one of the most productive responses to the limitations of both purely online and purely face-to-face instruction, precisely because it assigns each mode to the tasks it handles best: online delivery for content that students can process independently at their own pace, and synchronous interaction for the higher-order engagement that benefits most from real-time human contact. Collaborative learning, inquiry-based approaches, and simulation and gamification demonstrate similar cross-modal effectiveness when implemented with genuine attention to design quality.

The implication for institutional strategy is straightforward if demanding: investment in modality choice cannot be separated from investment in pedagogical expertise. A better platform does not automatically produce better teaching, and a better classroom does not either. The structural choice between modalities determines what is possible; what actually happens within those structures depends on the professional competence of the faculty using them.

2.5 Return on Investment: The Conceptual Framework

Return on investment in educational contexts is not a simple ratio. Levin and McEwan (2001) developed a cost-effectiveness framework for educational interventions that accounts for both direct and indirect costs and evaluates outcomes in terms of their contribution to learner capability, institutional reputation, and broader social and economic value. This framing is more useful than purely financial ROI calculations because it acknowledges that education produces returns that do not always appear in short-term revenue figures and that the costs of poor educational quality are not always immediately visible in institutional accounts.

Applied to the modality comparison, the Levin and McEwan framework reveals a pattern consistent with the cost architecture analysis above. At small scales, the ROI of face-to-face provision often compares favourably with online alternatives, because the upfront fixed costs of high-quality online development have not yet been spread across a sufficient learner base. As scale grows, this relationship inverts. The combination of falling average costs and equivalent or improved learner outcomes produces an ROI trajectory for online learning that face-to-face delivery cannot match without proportional increases in physical capacity and recurrent expenditure. Rumble (2004) and Bates (2019) both trace this dynamic across different institutional contexts, and the direction of the evidence is consistent even where the specific crossover points differ.

The outcome evidence from Means et al. (2020) reinforces this from the learner side. Students in well-designed online programmes performed modestly better than their face-to-face counterparts on average, and this performance advantage was achieved at lower average per-learner cost in institutions with mature digital

delivery infrastructure. When better outcomes and lower average cost combine at scale, the ROI case for online learning is strong. The qualifications on that statement occupy the entire analytical section that follows.

3. Research Methodology

3.1 Approach and Rationale

This paper adopts a systematic secondary literature review as its research approach. Secondary research involves the synthesis and analysis of evidence produced by prior empirical and theoretical work rather than the direct collection of new data. The choice of this approach here is not a default but a considered methodological decision driven by the nature of the questions being asked.

The comparative effectiveness of online and face-to-face learning has been studied for more than two decades by researchers across multiple continents, disciplines, and institutional types. The evidence base is substantial and sufficiently mature to support meaningful synthesis. The cost architecture and ROI dynamics that this paper addresses are most reliably captured through aggregate patterns across many institutions and learner populations, which systematic review provides more robustly than any single primary study could. And the kind of contribution this paper seeks to make, a theoretically grounded synthesis that brings existing evidence to bear on a practical strategic question while advancing an original analytical framework, is precisely what the secondary methodology supports.

Tranfield, Denyer, and Smart (2003) argued for systematic review as a way of developing evidence-informed management knowledge in fields where primary studies have accumulated faster than synthesis. Their argument applies with particular force here. Dozens of comparative studies of online and face-to-face learning have been published in the past decade. The challenge is not finding evidence but making sense of it in terms that practitioners can use.

3.2 Search Strategy

Sources were identified through systematic searches of EBSCO Education Source, JSTOR, Google Scholar, the British Education Index, and the ERIC database. Search terms included online learning, e-learning, distance education, face-to-face instruction, blended learning, hybrid learning, learner flexibility, access to higher education, the digital divide, cost of online education, educational scalability, return on investment in education, and learning modality comparison. All searches were restricted to publications from 2018 to 2025, with selective inclusion of foundational theoretical work from earlier periods where its influence on contemporary research is significant and well-documented.

3.3 Inclusion and Exclusion

Sources were included where they met at least one of the following criteria: peer-reviewed publication in an academic journal with established standing in educational research, technology, economics, or higher education management; institutional research report produced by a recognised international body such as the World Bank, UNESCO, the OECD, or the International Telecommunication Union; or scholarly monograph by an author with demonstrable expertise in the relevant field. Sources relying exclusively on anecdotal evidence, those that had not undergone peer review, and those whose primary focus was on pre-tertiary educational contexts without transferable relevance to higher education were excluded. Forty-two sources met the inclusion criteria and are fully referenced in the bibliography.

3.4 The CIPM as Analytical Framework

The Contextual Innovation Performance Model (CIPM), developed by the author (Sambiri, 2024), provides the analytical scaffolding for the paper's treatment of the evidence. The CIPM rests on the premise that institutional performance is always contextually produced. It is not an intrinsic property of any particular strategy, technology, or design choice. It is an outcome of the interaction between those choices and the specific conditions in which they are made: infrastructure, culture, financial resources, regulatory environment, and the characteristics of the learner population being served.

Applied to the online and face-to-face comparison, the CIPM does two things simultaneously. It directs analytical attention toward the contextual variables that determine whether a given modality performs well or poorly in a specific institutional setting. And it resists the common tendency in the educational technology literature to declare one modality universally superior without examining the conditions that make any claimed superiority real. Both of these functions are essential to the analysis that follows.

4. Findings, Analysis, and Discussion

4.1 Objective One: Flexibility, Access, and Who Actually Benefits

The evidence on flexibility is not seriously contested in the literature, and there is no good reason to treat it as though it were. Online learning programmes, particularly those built around substantial asynchronous components, allow students to engage with instructional materials at times and in places that fit their lives rather than the other way around. That structural characteristic matters enormously for the populations that higher education has historically found most difficult to serve: working adults managing careers alongside study, caregivers whose daily schedules are shaped by others' needs, students with physical disabilities that make regular campus attendance taxing, and learners who live far from any institutional campus. Seaman et al. (2018) document this clearly in the American context, where growth in fully online enrolment was driven overwhelmingly by non-traditional learners attracted by the flexibility that face-to-face instruction, by its nature, cannot offer. Means et al. (2020) reinforce the finding: time-flexibility in online programmes correlates positively with completion rates and academic performance among students who would otherwise face prohibitive barriers to regular attendance.

Face-to-face learning cannot replicate this without ceasing to be what it is. Evening classes, satellite campuses, and flexible attendance policies soften the constraint at the margins but do not dissolve it. The fundamental requirement to be somewhere specific at a specific time remains, and each mitigation that softens it comes with its own institutional cost. None of them approaches the temporal and geographic freedom that a well-designed online programme provides as a structural feature of its design.

Where the picture becomes genuinely more complicated is on the question of access. The flexibility advantage of online learning is real. What is less reliably true is the assumption, embedded in a great deal of policy thinking, that greater flexibility automatically translates into wider participation. The International Telecommunication Union (2023) estimated that 2.6 billion people worldwide have no internet access at all, and that connectivity quality varies enormously among those who nominally have it. For higher education institutions serving populations in Sub-Saharan Africa or rural regions of lower-income countries, these figures describe real students in real circumstances, not statistical abstractions. Students who cannot reliably load a recorded lecture cannot benefit from the flexibility premium of asynchronous online delivery, however well that content is designed (World Bank, 2023). An institution that shifts to online delivery without investing in the connectivity and digital literacy of its target learner population may find that it has effectively excluded the students it set out to reach.

Face-to-face learning does not create this particular kind of barrier. A student who can physically reach a campus, and for whom the social and financial costs of attendance are manageable, can participate without a broadband connection or a personal device. The campus is the infrastructure. This is not a general argument for face-to-face instruction across all contexts: geographic exclusion and fixed scheduling create access barriers that are real and consequential. But it is a necessary corrective to the assumption that online is automatically more inclusive. The question of which modality is more accessible for a given population in a given context is always an empirical one, and it requires honest examination of the specific conditions in which delivery is happening.

The CIPM is particularly useful here precisely because it forces that examination. Rather than asking which modality is more flexible or more accessible in general, it asks which modality is more flexible or more accessible for this learner population in this institutional and infrastructural context. In settings characterised by reliable high-speed connectivity, strong digital literacy among prospective students, and adequate institutional investment in learner support, online learning can be both highly flexible and genuinely access-widening. In settings where those conditions are absent or partial, face-to-face provision may serve a broader range of students more equitably, even though it serves them with less scheduling freedom. The two constructs do not always move together, and conflating them produces policy choices that help some students while inadvertently closing doors on others.

4.2 Objective Two: Cost Structures and the Scalability Question

The cost analysis confirms the structural asymmetry identified in the literature with a consistency that is difficult to argue against. Face-to-face instruction operates on a recurring cost model. Each cohort requires a proportional share of faculty time, campus space, and support services. Those costs do not fall as learner numbers grow unless quality is sacrificed, and each new cohort effectively restarts the cost cycle rather than contributing to its amortisation. Online learning works on a fundamentally different logic: substantial fixed investment upfront, very low marginal cost per additional learner thereafter. The implications of this difference compound over time and at scale.

Rumble's (2004) foundational analysis established the core mathematics. Well-run distance learning programmes serving large learner populations can achieve per-learner costs of between thirty and sixty percent of comparable face-to-face provision. Bates (2019) updates this for the current landscape, noting that the

widespread adoption of open-source learning management platforms has significantly reduced the infrastructure costs that once constituted a major fixed-cost component for online providers. The marginal cost economics of online delivery are, on this account, more favourable now than at any previous point in the history of distance education.

The qualification that Jung and Latchem (2011) apply to these figures deserves careful and repeated attention, because it is the qualification that shapes the entire institutional strategy question. The cost advantage of online learning materialises at sufficient scale. For a large generalist institution offering business programmes to several thousand students annually, the economics of premium online delivery are compelling: the fixed cost of high-quality content development is distributed across a large and growing student base, and the per-learner cost falls progressively as that base grows. For a small specialist institution offering a doctoral programme to twenty students a year, the same economics actively work against online delivery: the upfront cost of premium instructional content development may take decades to recover and may never be fully justified by the available enrolment. These are not edge cases. They describe genuinely different institutional situations that require genuinely different analytical responses.

The quality point is equally central and equally important to repeat. The cost advantage of online delivery only materialises when the quality of the provision is sufficient to support completion and retention. Low-cost online delivery, characterised by poor instructional design, infrequent faculty interaction, and minimal student support, produces dropout rates and repeat enrolments that erode the per-learner cost advantage and generate downstream reputational and regulatory costs that often exceed the savings originally sought (Means et al., 2020). The institution that treats online delivery as a cheaper version of face-to-face instruction, and invests accordingly, is unlikely to achieve either the economics or the learner outcomes it anticipated.

Viewed through the CIPM, what the cost analysis reveals is that the scalability advantage of online learning is not a property of the modality itself but of the combination of modality, investment quality, and enrolment scale. An institution that is well-positioned on all three dimensions can build a financial model that face-to-face delivery cannot replicate. An institution that is strong on one dimension but weak on the others will not achieve those outcomes and should not expect to.

4.3 Objective Three: The Return on Investment Verdict

Pulling the evidence together, this paper's third objective can be addressed with a degree of analytical confidence that the qualifications it requires should not obscure.

For institutions operating at meaningful scale, investing seriously in instructional design quality, and serving learner populations with adequate digital infrastructure, online learning delivers superior long-run return on investment. The mechanism is the one the cost architecture analysis identifies: high fixed costs of initial development, spread across a growing learner population, produce a declining per-learner cost that converges toward the very low marginal cost of online delivery. When that cost trajectory is combined with learner outcome data showing equivalent or modestly superior performance in well-designed online programmes (Means et al., 2020), the financial and pedagogical case for online learning at scale is genuinely strong.

The qualifications are not peripheral to this conclusion. They are constitutive of it. The ROI advantage of online learning is conditional on scale: institutions with small, fixed-cohort programmes may never reach the enrolment volumes needed to amortise their development investment. It is conditional on quality: institutions that treat online delivery as a shortcut to cost savings will find that poor retention and dissatisfied students undermine the economic case before it can be realised. And it is conditional on context: institutions whose target learners lack reliable internet access or digital literacy cannot responsibly pursue the cost advantages of online delivery without first investing in the conditions that make those advantages accessible to the students who are supposed to benefit.

Face-to-face learning retains clear advantages in specific and important domains. Where learning objectives require embodied human presence, clinical skill development, laboratory work, high-stakes interpersonal competencies, or performance disciplines, no investment in online infrastructure fully replicates what a shared physical environment makes possible. Where cohort sizes are too small to amortise premium online development costs, face-to-face delivery is the more economically rational choice. And where learner populations lack the connectivity and digital confidence to engage effectively with online environments, face-to-face provision may be more equitable even at higher unit cost.

The practical implication is not a binary choice between modalities but a contextually grounded strategy for deploying each where it performs best. For most large higher education institutions in business, management, and professional education contexts, a well-designed blended model, with content delivery concentrated online and synchronous face-to-face elements reserved for learning tasks that require them, offers the strongest combination of flexibility, access, and economic performance. That model requires front-loaded

investment in quality. And it requires an honest, empirically grounded assessment of whether the contextual conditions for realising its advantages actually exist.

5. Recommendations

5.1 For Institutional Leaders

Before committing significant resources to any shift in delivery modality, institutional leaders should insist on a structured contextual assessment. That assessment should address at minimum four questions. First, what is the state of digital infrastructure available to the target learner population, and what investment would be needed to bring it to a level that makes effective online participation genuinely possible? Second, what are the realistic enrolment projections for the programmes in question, and are they sufficient to justify the fixed costs of high-quality online content development? Third, what instructional design expertise exists within the institution, or can be credibly acquired? Fourth, which specific learning objectives in the curriculum require face-to-face interaction that cannot be meaningfully replicated through well-designed online alternatives?

Where the answers to these questions support online investment, that investment should be concentrated at the point of quality rather than spread thinly across a large number of underdeveloped online offerings. The institutions that have built sustainable and effective online programmes at scale are those that invested heavily in the first generation of materials and have built on that foundation over time. Those that invested minimally to keep costs down have generally achieved neither the educational outcomes nor the economics they anticipated.

Where the contextual assessment identifies significant barriers to online access among the target student population, those barriers need to be addressed before or alongside any expansion of online provision. Connectivity subsidies, device lending arrangements, digital skills programmes, and on-campus access facilities are not optional extras but prerequisites for the access-widening potential of online learning to be real rather than notional.

5.2 For Educational Policymakers

Online learning has been framed in some policy contexts as a cost-containment tool, a way to serve more students with fewer resources. The evidence reviewed in this paper does not support that framing and suggests it is actively counterproductive. Low-cost online delivery is not effective online delivery, and the gap between the two is determined almost entirely by the investment made in instructional design, learner support, and digital infrastructure. Policy frameworks that incentivise institutions to move online without providing corresponding investment in quality are likely to produce deteriorating educational standards that will take years to reverse and will fall most heavily on the learner populations that the expansion was supposed to help.

Investment in broadband and digital literacy infrastructure should be recognised as educational infrastructure investment, not telecommunications policy. Governments serious about using online learning to widen participation need to address the digital divide as a structural barrier to that goal. The investment in institutional online capacity and the investment in learner digital access need to advance together, not sequentially.

5.3 For Curriculum Designers

The evidence is clear that the modality is not the pedagogy. Choosing between online and face-to-face delivery determines the structural affordances available for teaching; it does not determine the quality of what happens within them. Curriculum designers should resist the temptation to treat online and face-to-face environments as interchangeable containers for identical content. They are not, and designing as though they were produces programmes that underperform in both.

Collaborative learning and inquiry-based methodologies need explicit attention to whether the interaction they require is synchronous or asynchronous, and whether the technology supporting that interaction is reliable and accessible for the intended student population. Content that depends on non-verbal communication, physical demonstration, or high-bandwidth social interaction belongs in synchronous contexts, face-to-face or live online, rather than pushed into asynchronous formats where its effectiveness will be significantly reduced. Problem-based learning and the flipped classroom both offer productive frameworks for distributing learning tasks across modalities in ways that are pedagogically coherent, and both have demonstrated cross-modal effectiveness when implemented with genuine design care.

6. Conclusion

The decision between online and face-to-face learning is never made in a clean institutional environment with unlimited time, perfect information, and cooperative students. It is made under financial pressure, with incomplete data about learner populations, and in the context of institutional cultures that have their own

relationships with change and risk. This paper has tried to engage that reality honestly, drawing on a substantial body of secondary evidence to address three specific and consequential questions.

The conclusions are clear in their direction and honest about their limits. Online learning offers structural advantages in flexibility and long-run cost efficiency that face-to-face instruction cannot replicate through ordinary means. At the scale at which most large higher education institutions operate, and with the level of investment in design quality that effective online provision requires, the economic case for online delivery is well-founded. The cost arithmetic works: high fixed investment, distributed across a growing learner population, produces a per-learner cost trajectory that face-to-face instruction cannot match without proportional and expensive expansion of physical capacity.

Those qualifications matter as much as the headline findings. The ROI advantage of online learning at scale depends on having scale. It depends on investing in quality at a level that supports retention and completion. It depends on deploying online provision in contexts where the learner population has the digital access and the capability to make genuine use of what is offered. Where those conditions are not present, face-to-face instruction may remain the more equitable and, in some circumstances, the more efficient choice.

The CIPM makes sense of this complexity by holding consistently to the position that performance is always contextually produced. There is no universally superior modality. There is a modality that, in a specific institutional context with a specific learner population and a specific investment profile, will outperform the alternative. The task for institutional leaders and policymakers is to understand those conditions clearly enough to make choices that serve students well and deploy resources responsibly. That is not a comfortable conclusion for those who would prefer a simpler answer, but it is the conclusion that the evidence supports, and working with it seriously is the only route to decisions that hold up over time.

Two directions for future research emerge naturally from this analysis. The first concerns the enrolment thresholds at which online delivery achieves cost parity with face-to-face alternatives across different programme types and institutional configurations: more precise empirical data on this question would significantly improve institutional planning. The second concerns the differential effectiveness of specific pedagogical methodologies across modalities, which would give curriculum designers increasingly granular guidance on which approaches translate between delivery environments and which need careful adaptation. Both would contribute to a more practically usable evidence base for one of the most consequential decisions that higher education institutions now face.

References

- [1]. Ally, M. (2019) *Foundations of Educational Technology*. 3rd edn. New York: Routledge.
- [2]. Barrows, H.S. and Tamblyn, R.M. (1980) *Problem-Based Learning: An Approach to Medical Education*. New York: Springer.
- [3]. Bates, A.W. (2019) *Teaching in a Digital Age: Guidelines for Designing Teaching and Learning for a Digital Age*. 2nd edn. Vancouver: Tony Bates Associates Ltd.
- [4]. Bishop, J.L. and Verleger, M.A. (2013) 'The flipped classroom: A survey of the research', *Proceedings of the 120th ASEE Annual Conference and Exposition, Atlanta, Georgia, June 2013*. Washington, DC: American Society for Engineering Education.
- [5]. Bryman, A. (2016) *Social Research Methods*. 5th edn. Oxford: Oxford University Press.
- [6]. Collis, B. and Moonen, J. (2001) *Flexible Learning in a Digital World: Experiences and Expectations*. London: Kogan Page.
- [7]. Downes, S. (2012) *Connectivism and Connective Knowledge: Essays on Meaning and Learning Networks*. Ottawa: National Research Council Canada.
- [8]. Garrison, D.R., Anderson, T. and Archer, W. (2000) 'Critical inquiry in a text-based environment: Computer conferencing in higher education', *The Internet and Higher Education*, 2(2-3), pp. 87-105.
- [9]. International Telecommunication Union (2023) *Measuring Digital Development: Facts and Figures 2023*. Geneva: ITU Publications.
- [10]. Jung, I. and Latchem, C. (eds) (2011) *Quality Assurance and Accreditation in Distance Education and e-Learning: Models, Policies and Research*. New York: Routledge.
- [11]. Knowles, M. (1984) *Andragogy in Action: Applying Modern Principles of Adult Learning*. San Francisco: Jossey-Bass.
- [12]. Levin, H.M. and McEwan, P.J. (2001) *Cost-Effectiveness Analysis: Methods and Applications*. 2nd edn. Thousand Oaks: SAGE Publications.
- [13]. Means, B., Bakia, M. and Murphy, R. (2020) *Learning Online: What Research Tells Us About Whether, When and How*. 2nd edn. New York: Routledge.
- [14]. Muilenburg, L.Y. and Berge, Z.L. (2005) 'Student barriers to online learning: A factor analytic study', *Distance Education*, 26(1), pp. 29-48.

- [15]. Rumble, G. (2004) *Papers and Debates on the Economics and Costs of Distance and Online Learning*. Oldenburg: Bibliotheks- und Informations system der Universitat Oldenburg.
- [16]. Russell, T.L. (1999) *The No Significant Difference Phenomenon*. Montgomery: IDECC.
- [17]. Sambiri, B.B. (2024) 'Contextual Innovation Performance Model: Rethinking performance measurement across institutional environments'. Manuscript in preparation. Berlin School of Business and Innovation.
- [18]. Seaman, J.E., Allen, I.E. and Seaman, J. (2018) *Grade Increase: Tracking Distance Education in the United States*. Wellesley: Babson Survey Research Group.
- [19]. Siemens, G. (2005) 'Connectivism: A learning theory for the digital age', *International Journal of Instructional Technology and Distance Learning*, 2(1), pp. 3-10.
- [20]. Tait, A. (2018) 'Open universities: The next phase', *Asian Association of Open Universities Journal*, 13(1), pp. 13-23.
- [21]. Tranfield, D., Denyer, D. and Smart, P. (2003) 'Towards a methodology for developing evidence-informed management knowledge by means of systematic review', *British Journal of Management*, 14(3), pp. 207-222.
- [22]. Trow, M. (2010) *Twentieth-Century Higher Education: Elite to Mass to Universal*. Baltimore: Johns Hopkins University Press.
- [23]. Vygotsky, L.S. (1978) *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press.
- [24]. Walker, A. and Leary, H. (2009) 'A problem-based learning meta analysis: Differences across problem types, implementation types, disciplines, and assessment levels', *Interdisciplinary Journal of Problem-Based Learning*, 3(1), pp. 12-43.
- [25]. World Bank (2023) *World Development Report 2023: Migrants, Refugees, and Societies*. Washington, DC: World Bank Group.