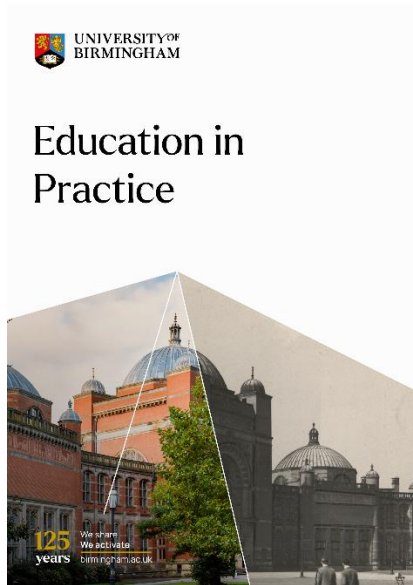




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Teaching tomorrow's accountants today: a Business Intelligence integration case study

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Abstract

This article examines the integration of Business Intelligence (BI) tools into undergraduate accounting education through a case study implementation at the University of Birmingham, Dubai. Responding to the accounting profession's ongoing digital transformation and identified competency gaps, a comprehensive BI integration framework was implemented in a third-year Business Analytics module with module lead reflections observed. The intervention is grounded in Yassin and Toumeh's (2024) five-stage framework; incorporated curriculum adaptation, research integration, skills development, interdisciplinary collaboration, and career transformation strategies. Results from 29 students demonstrated strong academic outcomes, with majority (83%) achieving upper-level classifications, 2.1 or higher, alongside enhanced practical competencies in data visualisation and analytical thinking. This paper contributes to pedagogical innovation, beyond accounting disciplines alone, by providing reflective evidence of effective BI integration methods and their impact on student learning outcomes and career readiness from the point of view of the Module Leader.

Keywords: Business Intelligence, Accounting Education, Tableau, Pedagogical Innovation, Business Analytics, Digital Competencies

Introduction

The accounting profession stands at a critical juncture, confronting unprecedented disruption from digitalisation and technological advancement creating industry transformation. This change has been described as one of “constant flux and development, neither finite nor stationary,” (Al-Htaybat and von Alberti-Alhtaybat, 2017, p.851) firmly highlighting the perpetual nature of change facing both accounting practitioners and educators alike. Consequently, this ongoing evolution demands a fundamental reassessment of how accounting education prepares students for professional practice.

Contemporary accounting education faces mounting criticism for inadequately preparing graduates for technology-driven professional environments observing that current academic approaches are “perceived as superficial, failing to integrate all the

necessary competencies" (Rindasu *et al.*, 2023, p.41) required in modern accounting practice. This criticism gains urgency given Kasztelnik and Campbell's (2025) documentation of a 7.4% decline in accounting degree enrolment, with students gravitating toward technology-focused disciplines instead (Maurer, 2023). This highlights the attention needed for accounting programmes to rapidly integrate relevant digital competencies to maintain relevance.

In addition, the consequences of inadequate Business Intelligence (BI) education extend beyond individual student preparedness to affecting the profession's competitive positioning. The persistent knowledge gaps may compel businesses to recruit practitioners from alternative industries, potentially diminishing accounting's traditional role as the primary provider of financial intelligence (Rindasu *et al.*, 2023) which requires immediate response from accounting educators.

This article presents a case study of BI integration in undergraduate accounting education at the University of Birmingham, Dubai, implemented over 11 weeks during Semester 2 in 2025. The intervention specifically addresses identified digital competency gaps through integration of BI tools, particularly Tableau, within a third-year Business Analytics module. By examining both the implementation process and resulting outcomes, this study contributes to inform pedagogical innovation in accounting education.

This reflective case study is positioned within the pedagogical viewpoint that supports practical work using real tools and data as central to learning, rather than an afterthought. Using Kolb's (2015) experiential learning cycle, the 4-stage cycle of Concrete Experience, Reflective Observation, Abstract Conceptualisation and Active Experimentation maps closely to what students produced in the Tableau story assignment. Students select a self-chosen dataset (Concrete Experience), investigate what the data is actually telling them (Reflective Observation), which shapes into a defensible argument for a potential client (Abstract Conceptualisation), and builds towards a finished story that can be interacted with, manipulated and learnt from (Active Experimentation). This also places huge emphasis on authentic tasks and using self-selected data integrates Herrington and Oliver's (2000) work on authentic learning whereby the focus is on transferable, future-facing skills reflecting a practical skills-based approach to curriculum design rather than only theoretical. More broadly, Kolb (2015) suggests experiential learning is very important in lifelong learning creating the "critical linkages among education, work, and personal development" (Kolb, 2015, p.20) which are imperative for the dynamic future of accounting.

Literature Review

The digital competency gap in accounting

The accounting profession's digital competency gap represents a critical disconnect between educational preparation and professional requirements. Abbas (2025) and

Rikhardsson and Yigitbasioglu (2018) identify a fundamental shortage of BI-focused accounting researchers, attributing this deficit to complexity in digitalisation and technical knowledge required to navigate advanced analytical tools. This research gap manifests in accounting educational curriculums.

Oesterreich and Teuteberg's (2019) empirical findings quantify the severity of this gap, revealing that merely 14% of accounting professionals possess business analytics competencies, despite 96% reporting general IT skills (Oesterreich and Teuteberg, 2019, p.342). This stark disparity highlights a critical distinction between basic technological literacy and analytical capabilities. The prevalence of general IT skills without corresponding analytical competencies suggests that exposure to digital skills alone currently proves insufficient.

Furthermore, conventional accounting assessments typically focus on calculation correctness and rule application, failing to develop the critical thinking and analytical skills. Alternative assessment approaches, while potentially addressing analytical thinking, frequently cannot replicate the dynamic, interactive reporting environments characteristic of professional BI software such as Tableau. This pedagogical limitation creates a disconnect between academic preparation and workplace realities. If higher education is to attract students it must recognise "the underlying learning experiences for accounting graduates demand an interdisciplinary approach that draws input from professionals and academic scholars with expertise in information systems, statistics, computer science and engineering, ethical issues related to IT and big data." (Stancheva-Todorova, 2018, p.138)

Frameworks for BI integration in accounting education

Yassin and Toumeh (2024) propose a comprehensive five-stage framework for integrating BI software into accounting education. This framework provides structured guidance across multiple areas of educational transformation. The framework's five stages include:

- (1) **Curriculum adaptation** through integration of BI teaching exercises using tools such as Excel and Tableau with hands-on practical learning through data-driven projects.
- (2) **Research focus** integrating latest accounting requirements and skills needed for professional adaptation.
- (3) **Skills and competences** development targeting students' data analysis, interpretation abilities, and technological proficiency with BI tools.
- (4) **Interdisciplinary collaboration** fostering partnerships with other departments for cross-functional projects.
- (5) **Career transformation** preparing students for the evolving industry demands and enhancing relevant employability through BI skills development.

This framework aligns with calls for experiential learning in accounting education. The emphasis on hands-on practical learning through data driven projects reflects recognition that BI competencies develop most effectively through application rather than passive instruction such as lectures. The career transformation stage explicitly addresses the employability requirement that is driving curriculum reform positioning BI skills development as central to career readiness to recognise that educational institutions must respond to industry demands while maintaining academic rigor. This dual focus on practical skills and theoretical understanding distinguishes the framework from purely vocational approaches that might lack conceptual depth.

Method and implementation

Context and participants

This section describes a practice-based, reflective case study drawing on the Module Leader's implementation experience and routine teaching data, rather than a formal empirical study involving structured data collection. The intervention was implemented during Semester 2, 2025, within the third-year Business Analytics module at the University of Birmingham's Dubai campus. The cohort comprised 29 students enrolled in the BSc Accounting and Finance programme representing a diverse international environment, as Dubai's student population typically represents multiple cultural and educational backgrounds. (Kamla, 2023)

The module's positioning in the third year proved strategically significant, as students possessed foundational accounting knowledge while remaining proactive and receptive to new learning approaches before entering professional practice. This allowed BI competencies to combine with existing accounting knowledge rather than requiring students to develop both simultaneously.

All feedback reported in this case study derives from routine, informal module evaluation activities undertaken as part of standard teaching practice such as student evaluation comments, emails of thanks, informal verbal feedback offered to the Module Leader during and after class, and the Module Leader's own observational notes made across the semester rather than from a formal research study. These activities fell within normal teaching and module evaluation processes and, in line with institutional policy, did not require separate formal ethical review. No individually identifiable data is reported and all student comments have been aggregated and anonymised into thematic summaries. Academic performance is reported at module-level rather than as individual results and comments were grouped into recurring themes rather than analysed individually. Consistent with the case-study approach and practitioner reflection nature of this article, the outcomes reported below should be read as indicative of the intervention's perceived value rather than as causal evidence of its effect on learning.

Implementation of the five-stage framework

The implementation addressed each component of Yassin and Toumeh's (2024) framework, adapting recommendations to specific institutional contexts while adhering to the framework's core principles.

Curriculum adaptation

Curriculum adaptation centred on creating comprehensive, accessible learning resources. This involved creating additional Tableau walkthrough recordings providing detailed, real-world interactive content, enabling students to observe and replicate professional BI activities after the classes had ended. These recordings addressed the difficulty found of demonstrating complex software functionality within time-pressured traditional lecture formats where practice is needed to obtain proficiency. By making resources available for repeated viewing, the approach accommodated diverse learning paces and styles.

Lecture slides were transformed into podcast format using software such as Google NotebookLM, again supporting students with different learning preferences and enabling content engagement beyond scheduled class times. This approach recognised that accounting students possess varied learning styles with some benefiting from visual demonstrations and others, audio explanations reviewable multiple times.

Research focus

Research was connected to classroom learning with current academic literature in business analytics and accounting to emphasise critical thinking and decision-making skills, aligning educational content with the Module Lead's research objectives and interests. This approach exposed students to contemporary debates regarding BI's role in accounting to advance research-based teaching and grounded practical skill development in theoretical frameworks.

The research dimension served a dual purpose to enhance student learning while informing ongoing faculty research. Classroom observations and student work provided informal insights into how accounting students develop BI competencies, contributing to broader contextual understanding of effective pedagogical approaches for faculty interests.

Skills and competencies development

Interactive exercises were used to support assessment criteria whereby students needed to select their own dataset for the independent Tableau assignment project with each student creating a practical Tableau 'story' designed for corporate audiences for an assignment worth 75% of their grade. This approach positioned students as business analysts presenting insights to decision making, replicating professional communication contexts via dashboards. The requirement to select personally relevant datasets enhanced engagement while enabling students to apply BI tools to domains of individual interest. Using an "ill-defined and unstructured" data selection

remit created the need for “sustained thinking over a number of hours to complete” (Herrington and Oliver, 2000, p.35) applying active learning as if students were problem solving in a work environment.

The Tableau story format proved particularly valuable for developing analytical stories which, unlike static reports, required students to produce insights logically and build compelling arguments through data visualisation. This format develops communication skills alongside technical competencies, addressing Nielsen’s (2020) emphasis on the need for accountants to be prepared to present information effectively to decision-makers. Educators must forge a link between technological capability and human expertise, and this conveys that pedagogical skills should position BI tools as enablers of enhanced decision-making rather than a replacement of professional judgment. Accountants must move away from ‘bean counting’ towards working as strategic partners (Rautiainen *et al.*, 2024, p.3) to interpret data and educational interventions must link technical competency with BI platforms to ensure automated outputs from data can be appraised critically.

Interdisciplinary collaboration

Faculty upskilling was required to deliver the module via MIT's Executive programme which ensured instructional capability. The Module Leader obtained concurrent enrolment in ‘DataCamp’ providing structure for continuous learning with six-month free student access enabling parallel development of instructor and student competencies. This investment in faculty development recognised that effective BI instruction requires current practical knowledge, as software capabilities and industry practices evolve continuously.

Collaboration with Singapore and UK campuses facilitated knowledge exchange across the University of Birmingham's international network. This multi-campus collaboration enabled sharing of effective practices while acknowledging contextual variations across locations.

Career transformation

Multiple industry case studies used exposed students to BI applications beyond traditional accounting contexts, supporting Li and Zheng's (2018) position that human judgment remains essential across diverse strategic decision contexts. This demonstrated BI's versatility while emphasising transferable analytical skills applicable across professional domains, not limited to accounting.

The career transformation dimension emphasised immediate employability enhancement, even for those students that will not pursue careers in accounting post-graduation. Multiple students reported to the Module Leader that they gained practical skills applicable to internship opportunities and future professional roles with enhanced CVs by demonstrating BI competencies increasingly valued across industries.

To provide a visual summary of how the five-stage framework informed module design and assessment, Table 1 below maps each stage to its corresponding design elements, assessment or evidence, and observed outcome.

Table 1

Framework Stage	Module Design Element	Assessment Evidence	Observed Outcome
Curriculum adaptation	• Walkthrough recordings • Lecture content converted to podcast format	• Canvas engagement analytics. • Student feedback on asynchronous material	• High interaction with materials • Accommodated the varied learning paces and styles
Research focus	• Classroom content linked to current BI/accounting literature and Module Leader's research interests	• Embedded in lectures and discussion. • Informal classroom observation	• Informed student learning • Contributed to faculty research understanding
Skills and competencies development	• Independent Tableau 'story' assignment using student-selected datasets (75% of grade)	• Tableau story project was assessed against a rubric	• Strong technical and analytical output. • Majority of students achieving upper-level classifications (2.1 and above)
Interdisciplinary collaboration	• Faculty upskilling (MIT Executive Programme, DataCamp). • Cross-campus collaboration with	• Faculty development reflections. • Cross-campus knowledge exchange.	• Shared practice • Consistency across campuses via informed and tailored practice

Framework Stage	Module Design Element	Assessment Evidence /	Observed Outcome
	Singapore and UK.		
Career transformation	- Multiple industry case studies used. - Explicit framing of transferable analytical skills.	Informal reports of student feedback including responses of gaining internship and employment outcomes.	Students reported internships across finance, technology, and consulting and not just limited to accounting.

Source: Natalie Al-Samarrai

Results and outcomes

Maintaining the themes of the Framework above for curriculum adaptation, research, skills and competences, interdisciplinary collaboration and career transformation the following outcomes were observed:

Academic performance

The module produced academic outcomes that exceeded Module Leader expectation, with a substantial majority (83%) of the 29 students achieving upper-level (first-class or 2.1) classifications in the inaugural implementation year in Dubai. This strong overall achievement rate suggests that BI integration enhanced rather than complicated student learning although there are no previous cohorts in Dubai to compare to at the time of writing.

These results proved significant given the module's demanding technical content using Tableau and need for considerable work to be done outside of the classroom. The strong performance suggests that comprehensive support mechanisms like walkthrough recordings, interactive exercises, and multimodal content delivery using DataCamp enabled students to master BI functionality within an 11-week period of a semester.

Skills development and confidence

Students developed substantial analytical understanding enabling effective information presentation to decision-makers, as evidenced by their Tableau story projects. Observations during the semester revealed growing confidence as students progressed from initial tool familiarisation to sophisticated data storytelling. The

student feedback captured informally in the case study particularly emphasised this confidence development.

Informal, aggregated feedback gathered by the Module Leader during and after the classes via verbal comments, emails of thanks and module evaluations indicated a recurring theme. For ethical reasons, individual comments are not reproduced or reported here and only thematic summaries are presented. However, several students described the module as among the most impactful they had studied, citing its perceived relevance to their future employability. Comments centred on feelings that theory and technical aspects of the module were relevant to all industries and work positions, not only accounting and finance. Students valued the hands-on experience with both Tableau and Excel which built practical skills that will extend beyond university.

Pedagogically, students communicated to faculty that they enjoyed the independence and autonomy of exploring Tableau with their own data which they felt would give them more confidence to adapt and learn on their own in the future. This supports Rindasu *et al.*'s (2023) argument that future accountants must learn how to learn rather than specific job skills and Kolb (2015) highlights that experiential learning is a suitable way to achieve life-long learning.

Engagement

The Canvas learning management system displayed high interaction with course materials along with high physical attendance in class. This sustained engagement suggests the practical orientation and relevance of the BI content, maintained student motivation despite substantial technical demands.

The success of walkthrough recordings proved particularly noteworthy due to requiring substantial faculty investment to produce. Students demonstrated appreciation via verbal feedback for these materials validating effort required to produce high-quality instructional content. The resources' asynchronous availability enabled students to engage with material at their own pace, accommodating different learning speeds.

Career readiness and professional application

Students have gained practical skills employable beyond university contexts with many reporting enhanced CVs featuring Tableau competencies that have facilitated internships across industries. Several students communicated to faculty that BI skills proved instrumental in securing competitive positions, as employers increasingly seek candidates with demonstrated analytical capabilities.

The cross-industry applicability of developed skills proved particularly valuable in Dubai's diverse economy. Students secured internships in finance, technology, consulting etc. demonstrating BI competencies' versatility. This variety addresses concerns that specialised tool training might limit career options instead, as Rautiainen

et al. (2024) suggests, BI skills appear to expand opportunities by signalling analytical sophistication applicable across domains. Goretzki *et al.* (2023) found that “management accountants currently work closely together in relatively few organisations” (Goretzki *et al.*, 2023, p.275) so this would have to improve as BI use grows and may provide strategic advantage.

Discussion and implications

Addressing the digital competency gap

This case study provides reflective evidence that BI integration can effectively address the digital competency gap identified in accounting education literature. The strong academic outcomes combined with demonstrated skill development suggest that comprehensive frameworks, rather than isolated tool training, enable sustainable competency development. The implementation's success in achieving high performance across diverse students indicates that BI capabilities, using current faculty, are broadly achievable rather than requiring exceptional technical aptitude.

The intervention's emphasis on critical thinking alongside technical proficiency addresses Rindasu *et al.*'s (2023) criticism of superficial approaches by requiring students to develop analytical narratives through Tableau stories.

Through the lens of Kolb's (2015) experiential learning cycle, the module's progression from data selection, through analysis, to a presented Tableau story mirrors the Concrete Experience, Reflective Observation, Abstract Conceptualisation and Active Experimentation he describes supporting how technical competence and critical engagement appeared to develop together rather than separately.

Scalability and resources

The successful implementation required substantial faculty development investment, including external training programmes and ongoing platform learning. This resource requirement presents scalability challenges, particularly for institutions with limited professional development budgets or high teaching loads. However, with the institution reflected in this study, cross collaboration across all three geographical campuses was maintained for consistency and reduces individual burdens.

In addition, the creation of walkthrough recordings and podcast materials potentially improves long-term scalability. As faculty proficiency increases through repeated delivery, the relative effort required for high-quality instruction may decrease.

Student independent learning

The implementation's emphasis on student dataset selection and independent project development proved crucial for engagement and learning depth. By enabling students to explore personally relevant topics, the approach fostered intrinsic motivation that sustained effort through technically challenging content. This student agency component may explain the high engagement levels reflected in class attendance and

Canvas interaction. This pattern is consistent with self-determination theory (Ryan and Deci, 2000), where “opportunities for self-direction were found to enhance intrinsic motivation” (Ryan and Deci, 2000, p.70) and identifies autonomy as one key driver of intrinsic motivation. It is the Module Leader’s interpretation that by allowing students to choose their own datasets, it may have supported a stronger sense of autonomy and ownership than a provided dataset would have.

Although this case study is set in accounting, the underlying reflections are not discipline-specific. The same approach could plausibly be applied in business analytics, finance, or other management modules where students need to translate data into a decision-relevant narrative for a non-technical, client audience.

Limitations and future research

This case study's primary limitation involves its single semester, single-campus scope detailed from the perspective of Module Leader observations and reflections. While outcomes proved encouraging, generalisability requires replication across diverse institutional contexts, student populations, and timeframes. Only the University of Birmingham's Dubai campus is represented here. The cohort size (n=29) is also relatively small, and the strong grade profile observed may partly reflect the particular characteristics of this cohort rather than the BI integration alone. As such, the outcomes reported here cannot support causal claims about the intervention's effect on academic performance; grades may reflect a range of contributing factors beyond BI integration, and the informal feedback gathered may be skewed toward more engaged students who were more likely to volunteer comments.

Future research should examine BI integration outcomes across multiple semesters to assess sustainability and identify refinement opportunities. Longitudinal studies tracking graduates' professional progression would identify whether developed skills translate into career advancement and enhanced practice. Comparative studies examining different BI platforms and pedagogical approaches would inform optimal implementation strategies.

Additionally, research investigating faculty experiences implementing BI integration would provide valuable insights into support needs and professional development effectiveness. Understanding instructor challenges and success factors would inform institutional support systems and faculty preparation programmes. Finally, studies examining student retention of BI competencies over time would assess learning usefulness beyond immediate academic outcomes.

Recommendations for practice

Based on this implementation's outcomes, several recommendations emerge for accounting educators and programme administrators considering BI integration:

- Prioritise experiential learning through meaningful hands-on projects rather than passive tool demonstrations.

- Invest in comprehensive faculty development recognising that effective BI instruction requires current practical knowledge beyond theoretical familiarity. Consider partnerships with industry or enrolment in executive education programmes.
- Develop learning resources accommodating diverse learning styles and enabling flexible engagement.
- Embed current academic research in BI education to develop critical thinking alongside technical proficiency.
- Foster cross-campus and interdisciplinary collaboration to share resources and effective practices.
- Emphasise career relevance explicitly, helping students recognise BI competencies' broad applicability and professional value. This connection enhances motivation and engagement.
- Enable student agency through dataset selection and project customisation, creating motivation and deeper learning due to personal interest.
- Plan for staff upskilling explicitly, recognising that BI instruction requires ongoing personal investment in tools and platforms alongside institutional training support.
- Share upskilling routes (e.g. executive programmes, platforms such as DataCamp) with colleagues considering similar integration, to reduce individual preparation burden.

Conclusion

This case study provides reflective evidence that systematic BI integration in undergraduate accounting education can help address identified competency gaps, while enhancing academic outcomes and career readiness. The implementation of Yassin and Toumeh's (2024) five-stage framework at the University of Birmingham, Dubai, resulted in strong academic performance, demonstrated skill development, sustained student engagement, and enhanced career prospects.

The strong overall achievement rate at upper-level classifications, combined with positive, thematically summarised student feedback and documented practical application of developed skills, provides indicative support for comprehensive BI integration approaches. These outcomes offer encouraging, preliminary evidence that accounting education can respond to digital transformation demands without compromising academic or theoretical rigour.

The intervention's success derived from multiple complementary elements such as comprehensive faculty development and preparation, multimodal learning resources, experiential learning emphasis, research integration, interdisciplinary collaboration, and explicit career relevance. This holistic approach addresses both technical skill

development and critical thinking creation, preparing students for professional roles requiring sophisticated analytical capabilities alongside traditional accounting expertise.

As the accounting profession continues evolving in response to technological advancement, educational institutions bear responsibility for preparing graduates with competencies demanded by practice. This case study provides encouraging evidence that such preparation is achievable through structured, comprehensive approaches informed by pedagogical research and professional requirements. The framework's successful implementation suggests pathways for broader curriculum transformation, contributing to accounting education's ongoing evolution in service of both student success and professional excellence.

Future implementations across diverse contexts will further refine understanding of effective BI integration, while longitudinal research will examine the lasting impact of these educational interventions on professional practice. Nevertheless, the case study's outcomes justify optimism regarding accounting education's capacity to meet contemporary challenges while preparing tomorrow's accountants for dynamic, technology-enabled professional environments today.

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