



Digital transformation and the evolution of university models: what does the future hold for the traditional university in the age of educational technology? : The case of Omnia Omnibus University, Kinshasa, DRC

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ABSTRACT

This study examines the digital transformation of university models through the case of Omnia Omnibus University (UOO) in Kinshasa, Democratic Republic of the Congo. It investigates how the adoption of digital technologies affects institutional governance, teaching practices, educational interactions, and the evolution of the traditional university model in a resource-constrained context. The research adopts a qualitative, exploratory case-study approach based on semi-structured interviews with 13 participants, including seven students, five teachers, and one administrative staff member. The analysis draws on 122 coded units of meaning and combines thematic analysis with descriptive and association tests. The findings reveal a significant gap between institutional ambitions and users' experiences. While the administration expresses a largely positive perception of digital transformation, teachers and particularly students report challenges related to connectivity, equipment, training, limited educational content, and insufficient interaction through institutional platforms. Students frequently rely on external tools such as WhatsApp, Google Scholar, and generative artificial intelligence to compensate for these limitations. The results also show that digitalisation has been more effective in administrative processes than in teaching and learning practices. Despite these constraints, teachers and students recognise the potential of digital technologies to improve accessibility, flexibility, interaction, and the future development of higher education. The study concludes that the transformation of the traditional university in the Congolese context requires more than technological infrastructure; it also depends on inclusive digital governance, stakeholder training, pedagogical integration, institutional connectivity, and sustained organisational change. The case of UOO illustrates both the opportunities and the structural challenges associated with developing a more hybrid and digitally integrated university model in the DRC.

Keywords: Digital Transformation; Higher Education; University Models; Educational Technology (EdTech); Digital Governance; Pedagogical Innovation; Digitalisation; Omnia Omnibus University; Democratic Republic of the Congo (DRC).

Introduction

Over the past two decades, higher education worldwide has undergone a profound transformation driven by the rise of digital technologies. In many regions – including North America, Europe and Asia – universities have gradually integrated virtual learning environments, automated academic management systems and educational data analysis tools,

thereby redefining teaching practices, modes of governance and interactions between academic stakeholders. Whilst this trend is global, it is not unfolding uniformly, particularly in African contexts where structural conditions often limit the uptake of digital technology.

In sub-Saharan Africa, the digital transition in higher education remains characterised by significant disparities. Institutions face persistent constraints such as poor connectivity, the high cost of equipment, the absence of ambitious digital education policies, and a lack of training for teachers in the use of digital tools (UNESCO, 2022; Mbodj, 2019). In the Democratic Republic of the Congo (DRC), despite political rhetoric in favour of digital modernisation, the majority of universities still operate on a largely manual basis, and distance learning initiatives remain limited and sporadic. As Sangaré (2020) points out, the institutional digital culture remains weak and technological systems, where they exist, are often underutilised.

Against this contrasting backdrop, some emerging institutions are nevertheless attempting to adopt innovative approaches. Omnia Omnibus University (UOO), founded in 2021, is a particularly telling case. Unlike many older institutions, it has integrated digital technology from the outset, by introducing a mobile app (Omnia App), a digital student portal, a virtual library and paperless academic management systems. This early focus reflects a clear commitment to modernisation, but it also exposes the university to major challenges relating to the adoption of these tools, the training of staff and the development of a suitable governance model.

The scientific interest of the UOO case lies precisely in this paradox: a strong digital ambition within an institutional and technological environment that remains fragile. By documenting this experience, it becomes possible to examine the practical aspects of digital transformation within a Congolese institution still under development, as well as the tensions, opportunities and limitations that accompany this process. This study thus forms part of a broader reflection on the evolution of university models in resource-constrained African contexts, where digital technology appears simultaneously as a driver of innovation and a source of vulnerability.

From this perspective, the research centres on a key question: **how does the digital transformation undertaken by Omnia Omnibus University affect teaching, administrative and organisational practices, and what does it reveal about the evolution of university models in the DRC?**

This study has three complementary objectives. Firstly, it aims to identify and describe the main digital systems implemented by Omnia Omnibus University since its establishment, in order to understand the technological and strategic choices underpinning its digital transition. Secondly, it seeks to analyse the effects of these tools on institutional governance, teaching practices and educational relationships, highlighting the transformations observed as well as any resistance or difficulties encountered. Finally, the study aims to identify lessons that may shed light on the replicability or limitations of this model, within a national context characterised by significant structural constraints.

Apart from the introduction and conclusion, this paper is structured into four sections: the first presents the literature review; the second outlines the methodology; the third presents the results; and the fourth and final section discusses the results.

1. Literature review

This chapter lays the conceptual and analytical foundations of the study. It is organised around two main points: the first concerns the theoretical foundations drawn upon (digital transformation, university models, pedagogical innovations); the second offers a critical review of the literature on the digitalisation of higher education, highlighting the contributions, limitations and academic debates in contexts comparable to that of the DRC.

Over the past decade, higher education has undergone an unprecedented transformation driven by the rise of digital technology. The digital transition is no longer limited to the adoption of specific technologies, but is bringing about profound changes in the structures, teaching practices and organisational approaches of universities. This chapter aims to establish the conceptual and empirical foundations underpinning our case study, by analysing the dynamics of digital transformation in higher education through a two-pronged approach: firstly, the theoretical framework employed to understand these changes (section 1.1); and secondly, a critical review of the existing scientific literature on the subject (section 1.2).

1.1. Theoretical framework

The theoretical section sets out a three-pronged approach. It draws firstly on research addressing digital transformation as a systemic organisational phenomenon; secondly, on studies examining the evolution of university models in the digital age; and finally, on contributions focusing on pedagogical innovations driven by educational technology (EdTech). This

theoretical intersection enables a clearer understanding of the multi-scalar, institutional, organisational and pedagogical logics that underpin digital transformation in universities.

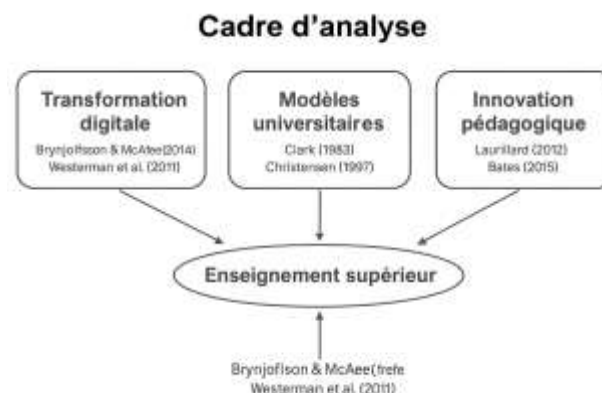


Figure 1: Analytical framework

1.1.1. Digital transformation as an organisational process

Digital transformation is not merely the introduction of technological tools or the digitisation of services. It refers to a more profound process of strategic, cultural and operational reorganisation within organisations. In their work, Brynjolfsson and McAfee (2014) highlight three fundamental dimensions of this transformation: *the exponential growth in computing power, the ability of digital systems to digitise a large proportion of human functions, and the increasing automation of cognitive tasks previously reserved for human intelligence.*

In this context, universities cannot remain on the sidelines. As institutions historically structured around centralised models and well-established routines, they are called upon to review not only their tools, but also their objectives and modes of governance. This concerns, for example, academic management – which is often still carried out manually in many African institutions – or the delivery of teaching, which is now tending to shift towards hybrid or online formats.

Westerman, G., et al. (McAfee, 2011) emphasise that digital transformation is not merely technical, but is above all a matter of strategic realignment driven by institutional commitment. From this perspective, the transition to digital requires clear leadership, structural decisions, but also gradual acceptance by those on the ground. It is not enough simply to roll out a platform or a mobile app: teachers must be trained in its use, students must see a genuine benefit in it, and administrative services must be reorganised to incorporate the new processes.

In the case of a university such as Omnia Omnibus, this perspective takes on its full significance. The implementation of digital tools – such as a student portal, a virtual library and paperless administration – only has real impact if it forms part of an overarching strategy, driven by the governing bodies and supported by a collective dynamic of organisational learning.

Digital transformation, in its university context, must therefore be conceived as a systemic process: it involves every level of the institution, from infrastructure to users' perceptions, including day-to-day practices and organisational balances.

1.1.2. The evolution of university models in the face of digitalisation

Reflection on the transformation of the university did not begin with the advent of digital technology, but the latter acts as a catalyst for the changes already underway. Clark (1983), in his 'triangle of coordination' model, identifies three competing logics in university governance: the state, the market and academia. The advent of digital technology tends to reinforce the market logic (competition, attractiveness, innovation) whilst redefining relationships with knowledge, students and economic actors.

Christensen (1997), with his theory of 'disruption', sheds light on the emergence of new entrants to the education market, such as EdTech platforms or virtual universities, which are shaking up established institutions. This phenomenon challenges the traditional model of the face-to-face university as the sole venue for the production and transmission of knowledge. Traditional universities must therefore adapt, or risk being marginalised in an educational landscape undergoing radical transformation.

At Omnia Omnibus University, this shift is reflected in the trialling of hybrid formats, the increased use of digital learning platforms, and a commitment to strategic repositioning within the national and international educational landscape.

1.1.3. Pedagogical innovation in the age of EdTech

The evolution of educational technologies raises major challenges in terms of pedagogy. According to Laurillard (2012), technologies are not neutral: they bring about a transformation of learning models by promoting interactivity, collaboration and the individualisation of learning pathways. Her 'conversational framework' model emphasises the importance of active mediation between teacher, learner and technology.

For his part, Bates (2015) emphasises the need for strategic planning regarding the use of digital technology in teaching, taking into account pedagogical objectives, available resources and the skills of those involved. He proposes a classification of digital tools based on their impact on accessibility, flexibility and the quality of teaching.

These approaches emphasise that pedagogical innovation does not rely solely on technology, but on an integrated consideration of learning objectives, teaching practices and students' needs. In the Congolese context, characterised by disparities in access and resistance to change, these models offer valuable guidelines for envisaging a gradual, inclusive and efficient integration of EdTech.

1.2. Critical literature review

A literature review plays a fundamental role in the structure of any scientific endeavour. It enables the study to be situated within an existing body of knowledge, whilst highlighting contributions, debates and persistent gaps. To our knowledge, few academic studies have examined in depth the processes of university digitalisation in the Democratic Republic of the Congo, and even fewer have focused on emerging institutions such as Omnia Omnibus University. It therefore seems relevant to examine the existing literature in the light of this specific case.

1.2.1. Digital transformation in higher education

Digital transformation in universities goes far beyond the mere digitisation of teaching materials. It involves a reconfiguration of organisational structures, teaching practices, and the relationship between the institution and its stakeholders. Brynjolfsson and McAfee (2014) point out that this transformation forms part of a broader cognitive revolution, in which technology enables the automation not only of physical tasks but also of intellectual functions. For their part, Westerman et al. (2011) emphasise the importance of a strong strategic vision to steer this transformation.

However, this global trend does not proceed at a uniform pace across different contexts. In developing countries, and particularly in sub-Saharan Africa, the adoption of digital technologies in higher education faces structural constraints: limited IT infrastructure, high connectivity costs, a lack of incentive policies, and a low level of ownership among stakeholders (UNESCO, 2022). That said, a few local initiatives demonstrate that a well-considered digital transition is possible, provided that it is underpinned by a solid institutional foundation and a shared commitment to transformation (Ndou, 2004).

In the DRC, the majority of universities remain on the periphery of these developments. The centralisation of academic processes, the low level of computerisation and the absence of a dedicated regulatory framework limit sustainable initiative. The case of Omnia Omnibus represents an exception here that is important to understand and document.

1.2.2. The evolution of traditional university models

University models, as conceptualised by Clark (1983), are based on a tripartite structure: the state, the market and academia. With the rise of EdTech and new societal expectations, these models are being put to the test. Christensen (1997) refers to the concept of ‘disruption’ in higher education, whereby new, more flexible institutions threaten traditional structures by offering more personalised and less expensive learning programmes.

Criticism of the traditional model centres on its slowness to adapt to technological developments and the needs of 21st-century learners (Altbach et al., 2009). However, several authors argue that we should not systematically pit old and new models against one another, but rather envisage a hybrid transformation, combining existing academic capital with digital innovations (Marginson, 2016).

1.2.3. EdTech and pedagogical innovation

The rise of educational technologies is profoundly transforming the ways in which teaching and learning take place. According to Laurillard (2012), EdTech offers unprecedented opportunities to tailor teaching to individual cognitive styles, enhance learner engagement and improve access to educational resources. Bates (2015), for his part, emphasises the need for a rigorous pedagogical framework to avoid technocentric excesses.

However, several criticisms have emerged: the actual pedagogical effectiveness of EdTech is sometimes difficult to demonstrate, as technologies often tend to reinforce existing practices without fundamentally transforming learning (Perret, 2020). Furthermore, teachers’ adoption of these tools does not depend simply on the roll-out of equipment, but requires a gradual shift in their habits as well as a genuine change in their professional approach, combining practical skills with new values (Perret, 2020). Finally, the inclusive nature of digital tools in contexts characterised by inequalities of access remains a crucial issue (Chigona et al., 2010).

1.2.4. Gaps in the literature and rationale for this study

Despite a growing body of academic research on the digitalisation of higher education, the majority of studies

remain centred on contexts in the Global North, where infrastructure is more favourable and transition policies are better structured. Writings on sub-Saharan Africa, and even more so on the DRC, are still few in number and often descriptive.

Furthermore, most studies focus on a single dimension: either technology, pedagogy or organisation. Few studies offer an integrated analysis of these dimensions, which limits our understanding of the systemic dynamics at play. This lack of theoretical and empirical convergence leaves a gap that this study seeks to fill. Drawing on the case of a Congolese institution undergoing significant change, Omnia Omnibus University, this research aims to explore the interactions between digital strategy, teaching practices and organisational restructuring, within a context of limited resources but one that is conducive to innovation.

2. Methodology

2.1. Nature and approach of the research

This study adopts a qualitative, exploratory and comprehensive approach, aiming to gain an in-depth understanding of the dynamics of digital transformation at Omnia Omnibus University (UOO). It takes the form of a single-case study (Yin, 2018), focusing on a specific institution within its real-world context, with the aim of producing grounded, contextualised and transferable knowledge.

This methodological choice is justified by the desire to understand the internal logic, the perceptions of those involved and the concrete effects of digitalisation on university operations, going beyond purely quantitative data.

2.2. Data collection method

The main data collection method adopted is the semi-structured interview. This type of interview allows the rigour of a structured guide to be combined with the flexibility needed to capture the diversity of participants’ experiences and perspectives (Paillé and Mucchielli, 2016). In order to structure the data collection, an interview guide was developed around four thematic areas, tailored to each category of stakeholder (students, teaching staff, administrative staff): strategic vision for digitalisation, digital governance and organisation, challenges and constraints encountered, and prospects for development and modelling.

2.3. Sample selection

Sampling was carried out using a reasoned approach, targeting individuals directly involved in or affected by digitisation processes.

Category	Number
Students	7
Teachers	5
Administrative staff	1
Total	13

All interviews were conducted during July 2025, with the exception of the interview with the administrative manager, who responded in writing via WhatsApp. The interviews took place in person and remotely, depending on the respondents' availability, and lasted on average between 6 and 10 minutes.

2.4. Data analysis tools

The qualitative analysis of the data was carried out using the full transcripts of the interviews, after correcting any initial transcription errors. A thematic analysis framework was developed manually, drawing on the open coding method derived from Grounded Theory (Charmaz, 2017). This process enabled the identification of units of meaning, which were then grouped into categories and subsequently into interpretative themes. Excel was used to structure the framework, code the responses, and generate summary tables to facilitate cross-interpretation of the data by respondent and by theme.

One hundred and twenty-two units of meaning (verbatim extracts) were thus coded and categorised according to six variables: the interviewee, their status, the question asked, the relevant extract, a summary, the sentiment expressed (positive, mixed, negative), associated keywords, the overarching thematic category and the degree of convergence with other responses. This quantification of qualitative data, now standard practice in content analysis (Paillé and Mucchielli, 2016), enables the interpretative analysis to be supplemented by descriptive statistics and association tests, presented in Section 3.

3. Presentation of results

This chapter presents all the results derived from the thematic coding of the 122 verbatim extracts collected from the 13 participants. Unlike an analysis focused solely on the four themes of the administrative interview guide, the present analysis covers the entire coding framework. This enables us to accurately reflect the relative weight of each category of actors and to objectively assess, using statistical tests appropriate for small qualitative samples, the convergences and divergences identified in the verbatim analysis.

3.1. Characteristics of the coded sample

The coded sample consists of 122 units of meaning distributed unevenly according to the respondent's status: 65 extracts from students (53.3 per cent), 50 for teaching staff (41.0 per cent) and 7 for administrative staff (5.7 per cent), the latter proportion reflecting the size of its sub-sample ($n = 1$) rather than any lesser relevance to the subject matter. Each category of participant was interviewed using a specific guide, which explains why the twelve summary thematic categories resulting from the coding are divided into three mutually exclusive blocks, with no overlap, as shown in Table 1.

Table 1: Breakdown of coded extracts by thematic category and status

Block / Thematic category	Source status	n	%
Strategic vision	Administration	2	1.6
Digital governance	Administration	3	2.5
Challenges & constraints	Administration	1	0.8
Modelling perspectives	Administration	1	0.8
Experience of digitalisation	Teachers	11	9.0
Teaching and technology	Teachers	14	11.5
Reflection on the university model	Teachers	11	9.0
Vision for the future	Teachers	14	11.5

Access to digital tools	Students	8	6.6
Uses and practices	Students	20	16.4
Perceptions and impacts	Students	26	21.3
Suggestions and expectations	Students	11	9.0

Source: Compiled by the authors based on the qualitative analysis grid (n = 122).

Two categories alone account for more than a third of the coded extracts: ‘Perceptions and impacts’ among students (26 extracts, 21.3 per cent of the total) and ‘Uses and practices’, also among students (20 extracts, 16.4 per cent). Figure 2 illustrates this imbalance graphically, suggesting that the results should not be interpreted solely in terms of the categories set out in the administrative guide.

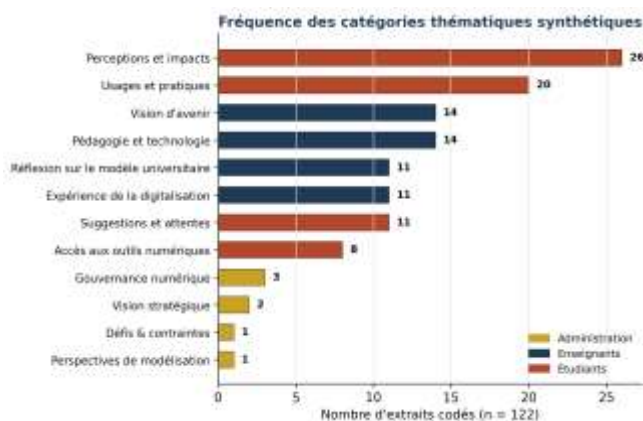


Figure 2: Frequency of summary thematic categories (n = 122)

Source: Compiled by the authors.

The degree of convergence, assessed by the authors for each extract by comparison with the responses of other respondents in the same category of stakeholders, is overwhelmingly rated as ‘Strong’ (88 extracts, 72.1 per cent) or ‘Moderate’ (32 extracts, 26.2 per cent), whilst the extreme ratings (‘Very strong’, ‘Weak’) remaining marginal (1 extract each). This finding indicates a relative homogeneity of viewpoints within each stakeholder category, a homogeneity that the cross-sectional analysis in section 3.5 qualifies when comparing categories.

3.2. Results relating to the administrative guide: strategic vision, governance, challenges, modelling

The administrative sub-sample (n = 7 extracts) is the one that most directly aligns with the four original themes of the interview guide. The administration affirms a clear strategic focus on digital innovation, structured around three timeframes.

‘Expanding access to education through our e-learning platforms... to remain competitive and maintain a positive image.’ — Administrative manager

“In the short term, we are aiming for brand awareness. In the medium term, to offer better services. And in the long term, to optimise processes.” — Senior civil servant

Digital governance is underpinned by an in-house IT unit supported by an external technical partner (Bee Technology Corporation), and follows a stated sequential process: needs assessment, exploration of solutions, and integration. The administration also states that it has performance indicators (dashboards, statistics).

“The IT unit works in partnership with Bee Technology Corporation... Decisions are taken following a needs assessment, exploration of tools and integration.” — Senior administrator

The main obstacle identified by the administration itself is financial in nature, which limits the scope of its stated ambition from the outset. Despite this, the administration expresses confidence in the potential for other Congolese or African institutions to replicate its approach, explicitly drawing on three levers: human, spiritual and technological.

“Yes, we believe our model is replicable. It is based on human, spiritual and technological levers.” — Administrative manager

Of the seven excerpts coded for this subsample, six are positive in tone and only one is mixed (the one concerning cost), which confirms an almost entirely optimistic institutional discourse, with no direct negative expressions (Table 2, section 3.5).

3.3. Findings relating to the teachers’ guide: experience, pedagogy, reflection, vision for the future

The teaching sub-sample (n = 50 extracts, 5 respondents) reveals a more varied relationship with digital technology, organised into four categories: lived experience of digitalisation, the alignment between pedagogy and

technology, reflection on the resulting university model, and the vision for the future of the profession.

Experience of digitalisation (n = 11)

This category is the most varied within the teaching staff sub-sample (3 positive extracts, 4 mixed, 4 negative). Teachers acknowledge that there is genuine institutional support, but consider it insufficient, if not simply non-existent.

'It's the university that provides the resources... but it's not yet sufficiently guaranteed.' — Ens1

"These are my own ideas, my own creations... personal initiatives." — Ens2

'No... I don't have the equipment provided by the university... I use my own computer.' — Ens3

"No, no, unfortunately... even the overhead projectors – the students have to sort those out themselves..." — Lecturer 5

Teaching and technology (n = 14)

Teachers make use of a wide range of tools, some of which are highly specialised depending on the subject (SPSS and Epidat in public health, remote sensing software in environmental studies), but also report a significant workload and material constraints.

"Computer, printer, WhatsApp, Zoom, the Omnia website, Skype, Microsoft, Excel, PowerPoint, Lightroom, Bitmate..." — Ens2

"You need to have the right equipment... a projector, a computer that's always on... it's hard work..." — Ens2

"Old-school, lack of equipment, socio-economic constraints." — Ens4

Reflections on the university model (n = 11) and vision for the future (n = 14)

These two categories are the only ones in the entire framework to contain no extracts reflecting a negative or mixed attitude: 25 out of 25 extracts are coded as positive. Teachers unanimously believe that digital technology has transformed their teaching practice in a positive way (time savings, interactivity, access to research) and envisage a professional future in which digital literacy becomes a prerequisite for practising their profession.

'Before, we used to dictate... now, we hand out the file... we explain freely... it saves time and is less stressful.' — Ens3

"Yes, more practical, faster, more inclusive... it includes those excluded from the system." — Ens4

"Strengthening the lab... the digital classroom... the network... making technology accessible to all... access codes... capacity building... even training in coding." — Ens5

This internal contrast within the teaching sub-sample – mixed real-life experiences but resolutely positive reflections and outlooks – constitutes one of the most original findings of this study: teachers clearly distinguish between their assessment of digital technology as an educational end in itself, which is unanimously favourable, and their assessment of the practical conditions of its implementation at the UOO, which is much more critical.

3.4. Findings relating to the student guide: access, uses, perceptions, expectations

The student sub-sample (n = 65 extracts, 7 respondents) is the largest and most varied. It alone accounts for 53 of the 122 extracts coded as 'Negative' or 'Mixed' across the entire study, making it the key point of entry for understanding the limitations of the uptake of the UOO's digital system.

Access to digital tools (n = 8)

Students use their own devices and their own mobile data plans or Wi-Fi connections, as the university does not provide any institutional connectivity that the respondents were aware of.

'We use Wi-Fi or mobile data plans... We sort it out ourselves.' — Stu1

"I've never seen a connection for students [...] we use our own connections." — Student 5

"Since I arrived, I haven't heard anything about it [...] I pay for my own mobile plans or bring my own little Wi-Fi." — Student 6

Uses and practices (n = 20)

The use of institutional tools remains limited to administrative functions (results, fees, appeals), whilst educational and social interactions take place almost exclusively via informal tools, with WhatsApp leading the way.

“No, it’s impossible to communicate with students through that.” — Student 1, on OmniaApp

“With the other students, we use WhatsApp, calls, the phone... We’ve got groups for actuaries.” — Etu2

“It’s really rare. I only use it to check my results.” — Student 6

Perceptions and impacts (n = 26, the most frequent category in the entire grid)

This category, dominated by a negative trend (18 negative extracts out of 26, or 69.2 per cent), contains the harshest criticism in the entire corpus: the lack of educational content on the official platforms and the perceived disengagement of teaching staff from these same platforms.

“On our website... there aren’t really any lessons... the teachers ignore the site.” — Etu3 (degree of agreement: Very strong)

“Teachers see it as a waste of time...” — Student 3

“There’s no interaction with the teachers [...] or with other students.” — Student 4

One positive counter-example is worth noting, however: several students value generative artificial intelligence tools from outside the university as an effective functional substitute.

“ChatGPT is like a lifesaver [...] you can turn to it when you’re stuck.” — Etu6

Suggestions and expectations (n = 11)

In contrast to the previous category, this one is once again overwhelmingly positive (10 out of 11 extracts), with students putting forward concrete proposals rather than mere criticisms – a shift that reflects a constructive engagement despite the dissatisfaction expressed elsewhere.

“Inspired by Google Scholar... integrate an electronic library.” — Student 2

“Books on design, algorithms and networks.” — Etu4

“Create collaborative spaces [...] for lectures, podcasts, proofs [...] educational interaction.” — Etu7

3.5. Cross-sectional analysis: trends, status and association tests

Beyond a category-by-category analysis, the ‘Trend’ variable—coded consistently across all 122 extracts regardless of the original guide—allows for a direct comparison between the three categories of participants. Figure 3 presents this comparison in terms of proportions.

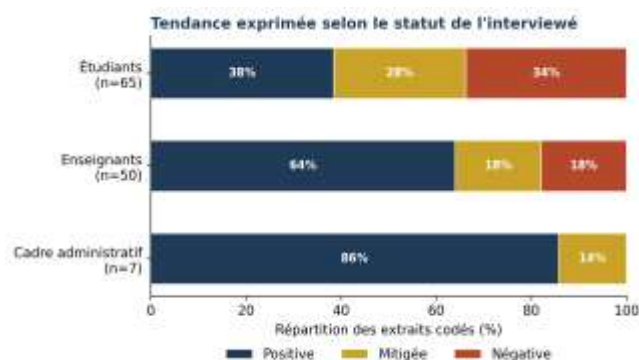


Figure 3: Trend expressed according to the interviewee’s status

Source: compiled by the authors, based on a cross-tabulation of Status × Trend (n = 122).

A clear gradient emerges from the institutional level down to the grassroots: 85.7 per cent of administrative extracts are positive, compared with 64.0 per cent of teaching staff extracts and only 38.5 per cent of student extracts. This gradient quantifies and corroborates the gap between intentions and actual outcomes, which had already been suggested by a reading of the verbatim transcripts.

To test the statistical robustness of this gradient, a chi-squared test of independence was conducted between status and attitude. Across all three categories (Table 2), the test is significant ($\chi^2 = 11.32$; ddl = 4; $p = 0.023$), but three of the nine cells in the table have a theoretical sample size of less than 5, mainly due to the small size of the administrative sub-sample (n = 7): this result should therefore be interpreted with caution, as the assumption of sufficient sample sizes is only imperfectly met. A further limitation, inherent in any quantification of interviews, must be explicitly noted: the seven administrative extracts come from a single respondent and therefore do not constitute statistically independent observations in the strict sense of the chi-squared test; the results relating to the administration must consequently be interpreted as indicative rather than inferential.

Table 2: Cross-tabulation of Status $\times$ Trend and chi-squared test

Status	Positive	Mixed	Negative	Total
Administration	6	1	0	7
Teachers	32	9	9	50
Students	25	18	22	65
Total	63	28	31	122

$\chi^2 = 11.32$; $df = 4$; $p = 0.023$; Cramér's $V = 0.215$. Source: compiled by the authors.

A second test, restricted to the two robustly sized subsamples – teachers ($n = 50$) and students ($n = 65$), both comprising several independent respondents – confirms and reinforces this result without the methodological limitations specific to the administrative subsample. The exact Fisher's test, applied to the binary variable 'Positive' versus 'Not positive' (with 'Mixed' and 'Negative' grouped together), is significant at the 1 per cent level (odds ratio = 0.352; $p = 0.0085$): a teacher is significantly more likely than a student to express a positive attitude (64.0 per cent versus 38.5 per cent).

Table 3: Fisher's exact test, positive attitude by status (teachers vs students)

Status	Positive	Non-positive	% Positive
Teachers ($n = 50$)	32	18	64.0%
Students ($n = 65$)	25	40	38.5%

Fisher's exact test: odds ratio = 0.352; $p = 0.0085$. Source: compiled by the authors.

This statistically robust result confirms, beyond a mere qualitative interpretation, that the discrepancy in perception between teachers and students is not an artefact arising from the selection of verbatim transcripts but a structural feature of the collected corpus. It constitutes one of the key empirical findings of this study.

Cross-analysing the degree of convergence with the overall trend provides further insight: extracts showing strong convergence are predominantly positive (53 out of 88, or 60.2 per cent) or negative (27 out of 88, or 30.7 per cent), whilst extracts showing moderate convergence are predominantly mixed (19 out of 32, or 59.4 per cent). In other words, when respondents within the same category agree strongly, their agreement most often centres on a clear-cut judgement, whether positive or negative; conversely, it is in areas of weaker convergence that nuanced positions are found.

3.6. Lexical analysis of keywords

The 122 keywords associated with the coded extracts were analysed for frequency, with the fifteen most frequent occurrences shown in Figure 4.

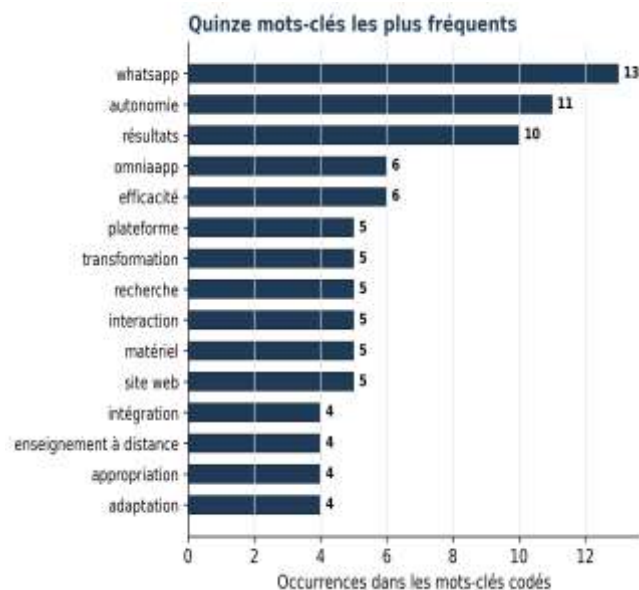


Figure 4: The fifteen most frequent keywords in the coding grid

Source: compiled by the authors.

The most significant finding of this lexical analysis concerns the respective prominence of the two main communication tools mentioned: 'WhatsApp', a non-institutional app, appears in 13 instances as a keyword (14 extracts explicitly mention WhatsApp in the coded text, 11.5 per cent of the corpus), whilst 'OmniaApp', the university's official app, appears only six times as a keyword (21 extracts mention Omnia in a broader sense, including the text, 17.2 per cent of the corpus, but most often to criticise its limitations). When considered solely in terms of communication and interaction between peers or with teaching staff, WhatsApp's dominance is absolute: no excerpt mentions a functioning communication

feature within OmniaApp, whilst fourteen excerpts – six from teaching staff and eight from students – describe active use of WhatsApp for this purpose.

This shift towards a mainstream tool not controlled by the institution constitutes a phenomenon of the informalisation of educational and administrative communication, which the discussion (section 4) interprets in the light of the theoretical framework drawn upon in the literature review.

The keywords ‘autonomy’ (11 occurrences) and ‘results’ (10 occurrences) also confirm two findings already identified qualitatively: on the one hand, a *de facto* empowerment of users, who are forced to make up for the shortcomings of institutional support using their own resources; on the other hand, a very strong focus of students’ use of the official platform on simply checking academic results—a function for which it was primarily designed and for which it generally proves satisfactory.

Finally, an analysis of the extracts simultaneously mentioning a connectivity constraint – such as Wi-Fi, internet connection, data plan or electricity – totalling thirteen extracts, eleven of which come from students, and their associated sentiment (seven negative, three mixed, three positive) highlights a final observation: the digital divide in terms of hardware access primarily affects students, whilst teachers, who are better equipped on an individual basis, are statistically less likely to express this directly in their own verbatim comments.

4. Discussion of the results

This chapter has a twofold objective. Firstly, it explicitly links the results presented in the previous chapter to the six authors drawn upon in the theoretical framework (section 1.1), in order to ascertain to what extent, the case of the UOO confirms, qualifies or contradicts their respective propositions. It then draws on three strategic analysis tools—FFOM analysis, the Ishikawa diagram and Porter’s Five Forces model—to provide a comprehensive and actionable interpretation of these same results.

4.1. A review of the theoretical framework in light of the results

Brynjolfsson and McAfee (2014) break down digital transformation into three dimensions: computing power, the dematerialisation of functions and the automation of cognitive tasks. The UOO’s findings fully validate the first half of this proposition – the dematerialisation of enrolments, results and academic fees – but do not validate the second part: no extract from the corpus, across all statuses, reports any automation or dematerialisation of the teaching functions themselves (online

courses, remote assessments, automated marking). The transformation observed is therefore a partial administrative digitisation, halted before reaching the pedagogical frontier, which significantly qualifies the sweeping interpretation of the ‘cognitive revolution’ proposed by the authors for this specific context.

Westerman et al. (2011) assert that digital transformation is primarily a matter of strategic realignment driven by institutional will, rather than a mere accumulation of technical tools. The case of the UOO illustrates here, almost in its purest form, the risk that these same authors implicitly identify: the university has the tools (Omnia App, portal, IT unit, technical partnership), but the statistically established gap in section 3.5 between the positive trend at the top (85.7 per cent) and that on the ground (38.5 per cent amongst students) demonstrates that the clear leadership, referred to by Westerman et al., has not yet led to the gradual acceptance by those on the ground that these authors present as the condition for success. The technical roll-out preceded, rather than accompanied, the process of adoption.

Clark (1983) describes university governance as a triangle under tension between the state, the market and academia. The dominant keywords in administrative discourse—competitiveness, reputation, image and optimisation—reflect a marked strengthening of market logic, in line with what Clark anticipated as a result of digitalisation. However, this strengthening is taking place here at the relative expense of the academic logic of ‘ ’: the ‘Perceptions and impacts’ category relating to students – in which negative responses accounted for 69.2 per cent – specifically concerns the lack of pedagogical implementation of this market-driven strategy (lack of online courses, perceived disengagement on the part of teaching staff). Clark’s triangle, in the case of the UOO, therefore appears unbalanced in favour of the market and administrative pole, to the detriment of the academic pole.

Christensen (1997) attributes university disruption to new external entrants—EdTech platforms and virtual universities—which compete with the established institution. The findings from the UOO suggest a local variant of this mechanism: here, disruption does not stem from an external institutional competitor, but from informal practices developed by the users themselves within the university itself: ChatGPT used as a substitute tutor, Google Scholar as a substitute library, and WhatsApp as a substitute communication channel. This is disruption through internal circumvention rather than external competition – a mechanism that Christensen’s theory, designed for more mature education markets, does not explicitly anticipate but which extends its logic: *when the institutional offering is*

perceived as inadequate, users bring about their own alternative ecosystem, which is free and already available.

Laurillard (2012) places active mediation between teacher, learner and technology at the heart of her ‘conversational framework’. However, the results show, consistently across several students, an almost total absence of interaction facilitated by the official digital tools: no communication features were identified on OmniaApp, either between students or with teachers. The technology deployed at the UOO therefore functions essentially as a top-down channel for disseminating administrative information, rather than as a space for conversational mediation in Laurillard’s sense. This finding precisely identifies the missing link between technical equipment and pedagogical innovation that the researcher calls for.

Bates (2015) argues that the success of any digital integration depends on planning that takes into account the actual skills of those involved. The 28 extracts from the corpus referring to training or support – of which only 11 were positive, compared with 17 that were mixed or negative – empirically document the blind spot identified by Bates: the competence of teachers and students has not been treated as a planning variable in its own right, but as a consequence assumed to follow automatically from the technical roll-out alone, with several teachers explicitly describing themselves as self-taught due to the lack of structured training provision.

4.2. SWOT Analysis (Strengths – Weaknesses – Opportunities – Threats)

The SWOT analysis below summarises, based on the coded results, the internal and external factors shaping the UOO’s digital transformation.

Table 4: SWOT matrix for digital transformation at the UOO

Strengths	Weaknesses
A proactive approach from the university’s inception (2021); tools rolled out from the outset (Omnia App, website, portal, virtual library announced); structured digital governance, supported by an external technical partner (Bee Technology); successful digitisation of administrative procedures (online enrolment, results, fees); a clear strategic vision articulated by the management (85.7 per cent positive sentiment); external institutional recognition (member of the AUF).	A statistically significant discrepancy between the rhetoric at the top and the reality on the ground ($p = 0.0085$); a lack of educational content and interaction on the official platforms; governance perceived by staff and students as top-down and lacking in consultation; support and training deemed insufficient (17 negative or mixed comments out of 28); reliance on an informal tool (WhatsApp) rather than institutional channels for actual communication.
Opportunities	Threats
A constructive appetite amongst the three categories of stakeholders, particularly students (10 positive suggestions out of 11); informal practices already well-established (WhatsApp, ChatGPT, Google Scholar) which could be formalised and integrated rather than competing with them; a stated desire for the model to be replicated at other Congolese or African universities; technical and institutional partnerships already underway, with potential for expansion.	A digital divide in terms of hardware access, primarily affecting students (connectivity, devices, data plans); risk of academic disengagement if lecturers’ lack of engagement with the platforms is confirmed (‘lecturers are unaware of the site’); increasing substitution by free external tools, which could permanently marginalise the institution’s offering if it is not strengthened; possible exhaustion of individual digital initiatives lacking institutional support.

Source: compiled by the authors based on the coded results (section 3).

The UOO has significant strengths, notably a proactive approach and tools that have already been rolled out. However, its model remains fragile if internal weaknesses – such as training, communication and access – are not addressed swiftly, at the risk of jeopardising stakeholder buy-in and the sustainability of the digital project.

4.3. Ishikawa diagram: the causes of the underutilisation of the digital system for teaching purposes

The Ishikawa diagram (cause-and-effect diagram, or fishbone diagram) enables the factors explaining the core dysfunction identified by the results – the underutilisation of institutional digital tools for teaching purposes, despite their technical availability – to be organised around four categories of causes.

Table 5: Causes of the underutilisation of digital tools in teaching (4M method)

Group of causes	Causes identified in the corpus
Workforce	Lack of digital training amongst teaching staff, explicitly acknowledged (“not sufficiently [trained]... a real constraint”, Ens4); widespread self-learning due to a lack of structured provision (Ens2, Ens3); a generational divide reported by the teachers themselves (“old school”, Ens4).
Method	Top-down digital governance, with no consultation of teachers on the choice of tools; lack of a formalised change management process; lack of accessible guidance or user documentation, as identified by respondents.
Equipment	Lack of equipment provided by the university (overhead projectors, computers); lack of documentary content despite a section being advertised (“there are no books in it”, Student4); recurring technical faults with the application (“frequent bugs”, Student6).
Environment	Lack of institutional Wi-Fi access for students; cost of data plans borne by users; energy constraints limiting the use of certain equipment (cost of generators, Ens1).

Source: compiled by the authors based on the coded results (section 3).

Digitalisation at the UOO is hampered by a range of human, technical and organisational factors, demonstrating that success does not rest solely on technology, but on a comprehensive and shared approach to change management.

4.4. Porter’s Five Forces Model applied to the UOO’s positioning

When applied to the Congolese university sector, Porter’s Five Forces model enables an analysis of the UOO’s competitive positioning, in particular the way in which its digital offering influences its ability to retain and satisfy its stakeholders in the face of external alternatives.

Table 6: Porter’s Five Forces applied to the UOO’s digital positioning

Competitive force	Interpretation as applied to the UOO
Rivalry amongst existing institutions	Moderate to strong: the UOO explicitly sets itself apart through an early digital strategy, which has been touted as a factor in its competitiveness and reputation since its inception (administrative discourse).
Threat of new entrants	High, but of an atypical nature: the threat does not come from competing institutions but from EdTech platforms and consumer-oriented tools (ChatGPT, Google Scholar, YouTube) already actively used by students and lecturers as substitutes for the institution’s own provision.
Bargaining power of ‘customers’ (students, families)	Growing: the free availability of external digital alternatives reduces students’ dependence on the university’s digital learning provision, which they currently regard as inadequate (category ‘Perceptions and impacts’).
Bargaining power of technology providers	High: the UOO’s digital governance relies on a single partnership with an external service provider (Bee Technology), which creates a strategic dependence on a supplier that cannot be replaced in the short term.
Substitute products	Strong: self-directed learning via free digital resources and social media as a de facto channel for educational communication already constitute effective substitutes for the official institutional provision.

Source: authors’ analysis based on coded results (section 3).

The UOO operates in a competitive and unstable environment, where differentiation through educational quality and digital innovation constitutes a key competitive advantage. However, this differentiation can only be sustainable with more active involvement from the entire academic community.

4.5. Summary of the discussion

This discussion highlights a promising but as yet incomplete institutional dynamic. The UOO’s experience illustrates an emerging model, based on a bold vision and validated by the theory of digital transformation as an organisational phenomenon (Brynjolfsson and McAfee, 2014; Westerman et

al., 2011), but which remains vulnerable – as confirmed both by the statistical results in section 3.5 and the three analytical frameworks used above – unless it is underpinned by more inclusive governance, a pedagogical approach supported by training, in line with Bates’s (2015) recommendations, and an infrastructure strategy tailored to local realities – the only means of restoring the balance of Clark’s (1983) triangle between the market, the state and academia.

Conclusion

This research, centred on the digital experience at Omnia Omnibus University (UOO), has shed light on the dynamics, tensions and potential inherent in digital transformation within Congolese higher education. Through a qualitative and contextualised approach, based on a single case study and supported by the statistical analysis of 122 coded extracts, it has been possible to document the digital systems deployed, to quantify the perceptions of the various university stakeholders, and to examine the institutional mechanisms underpinning this transition.

This analysis reveals that digitalisation at the UOO is underpinned by a clear strategic commitment and a resolutely innovative approach, which is overwhelmingly positive at the administrative level (85.7 per cent of the extracts). However, this approach is at odds with a statistically significant discrepancy in on-the-ground experiences: lecturers express a positive attitude in 64.0 per cent of the coded extracts, whilst students do so in only 38.5 per cent (Fisher’s exact test, $p = 0.0085$). This discrepancy is particularly evident in the lack of educational content and interaction on official platforms, in the shortfall in training and support, and in a digital governance structure perceived as top-down, all of which limit co-creation and the effective adoption of these systems by users.

The Omnia Omnibus experience illustrates an attempt to break with traditional models by proposing a university paradigm centred on digital technology, flexibility and spirituality. Although the model still has limitations in terms of structure and sustainability – notably a marked lack of formalised institutional communication in favour of mainstream tools such as WhatsApp – it opens up interesting prospects for the reform of higher education in the Democratic Republic of the Congo.

This study suggests that the success of a digital transformation project in higher education does not rest solely on technology, but on a comprehensive, inclusive and context-specific approach to change management, in line with the predictions of Westerman et al. (2011) and Bates (2015), whose work is

drawn upon in the discussion. It therefore calls on institutions to rethink their digital strategy, taking into account local realities, stakeholders on the ground, and long-term educational objectives.

Ultimately, Omnia Omnibus University, despite its youth, embodies a living laboratory of academic transition, the analysis of which can enrich the debate on African university models in the EdTech era, navigating the balance between opportunity and complexity, innovation and deep-rooted tradition. One limitation of this study, inherent in the size of the administrative sub-sample ($n = 1$ respondent), calls for it to be repeated using a larger administrative sample, which would enable the trends documented here—albeit indicatively for this hierarchical level—to be consolidated through fully valid statistical tests.

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Appendices:

Semi-structured interview guide:

• Participant: Student

Theme 1: Access to digital tools

- Can you describe the digital tools you use during your studies at Omnia Omnibus University?
- How do you access these tools? (Mobile phone, computer, Wi-Fi, data plans, etc.)
- Do you encounter any obstacles in accessing them regularly?

Topic 2: Uses and practices

- What tasks do you mainly use these tools for? (Enrolment, lectures, assignments, communication, etc.)
- How often do you log in to the university's platforms?
- Do you also use them outside of lessons? What for?

Theme 3: Perceptions and impacts

- In your opinion, how have digital tools improved your university experience?
- And in what ways might they be perceived as restrictive or inadequate?
- Do you feel more independent in your learning thanks to these tools?

Theme 4: Suggestions and expectations

- What digital tools or services would you like to see introduced or improved at the university?

- If you could propose a digital innovation for your university, what would it be?

- **Stakeholder: Teachers**

Theme 1: Experience of digitalisation

- Since when and how have you incorporated digital tools into your teaching?
- Which tools do you actually use (Omnia App, Google Meet, WhatsApp, Excel, etc.)?
- Do you feel supported by the university during this transition?

Theme 2: Teaching and technology

- Have these tools changed the way you teach? How?
- Do you think teaching has become more effective thanks to digital technology?
- What challenges are you facing in this transformation?

Theme 3: Reflections on the university model

- In your view, how does Omnia Omnibus University stand out from other Congolese institutions through its use of digital technology?
- Do you think this model could be adapted for use in other institutions?

Theme 4: Vision for the future

- In your view, what is the role of teachers in this digital age?
- How do you envisage your profession in 5 to 10 years' time in this context?

- **Stakeholder: Administration (rector's office, academic management, digital unit)**

Theme 1: Strategic vision

- What were the main motivations behind the university's digitalisation from the outset?
- What are the short-, medium- and long-term objectives of this digital strategy?
- How does this transformation fit in with the university's educational and spiritual mission?

Theme 2: Digital Governance

- Which structures or units manage digital tools at Omnia?
- How are decisions regarding digital innovations made?
- Are there any digital performance indicators (dashboards, feedback, statistics)?

Theme 3: Challenges and constraints

- What are the main obstacles encountered in the implementation of digital technology?
- How do you manage the continuing professional development of teachers and staff?
- How do you address students' specific needs (inclusivity, equitable access, etc.)?

Theme 4: Prospects for modelling

- Do you think that Omnia Omnibus's digital experience could serve as a model for other Congolese or African universities?
- What factors (human, spiritual, technological) underpin this strategic positioning?

Qualitative analysis grid:

The complete grid (122 units of meaning coded according to ten variables: interviewee, status, question asked, relevant extract, summary, trend, keywords, summary thematic category, degree of convergence) is provided in a separate file (Grille_analyse_qualitative.xlsx) and constitutes the comprehensive source for all the statistics, tables and figures presented in sections 3 and 4 of this article.