Implementation of the Contextual Bayesian Model for Personalized, Reasoned Multi-Criteria School Orientation:Application to the Ivorian Context.

Abstract:

School orientation in sub-Saharan Africa reflects structural inequalities linked to geographic origin, socio-occupational category, and gender, an observation that motivated the design of a contextual Bayesian system recommending a post-baccalaureate track based on the student's academic profile, psychological profile, and socio-economic situation. This article examines the conditions for its real-world deployment in Côte d'Ivoire, beyond its algorithmic performance alone. An offline-capable technical architecture is proposed for institutions lacking reliable internet access, combined with a progressive deployment that respects local institutional cycles. The contextual variables are redefined for the Ivorian context, with the addition of a gender variable correcting orientation biases documented in the literature. A multidisciplinary governance framework monitors algorithmic bias and guarantees the transparency of recommendations to families. A change-management strategy enriches the guidance counselor's role rather than replacing it, through a usage protocol based on the confidence level of the recommendations. High algorithmic performance thus remains a necessary but not sufficient condition for a real impact on school equity.

Keywords: *school orientation; contextual Bayesian model; algorithmic fairness; AI governance; change management; sub-Saharan Africa*

1. Introduction

School orientation constitutes a decisive fork in every student's academic trajectory. In sub-Saharan Africa, this reality is compounded by documented structural inequalities between rural and urban settings, between genders, and between socio-occupational categories. Bourdieu and Passeron [1] theorized how education systems perpetuate these inequalities by converting inherited economic and cultural advantages into valorized academic performance. The Contextual Bayesian Model (MBC), proposed in our earlier work [15], addresses this challenge by integrating five socio-contextual variables into the academic vector, achieving

97% precision in K=10 cross-validation (100% in hold-out) and explicitly flagging uncertain profiles via the confidence index CI(i, c*).

Remarkable algorithmic performance is not enough to guarantee real-world impact, in a context of heterogeneous digital infrastructure, limited connectivity, and constrained human resources.

This article addresses three operational questions: how to deploy the MBC in institutions with varying digital resources; how to build ethical governance adapted to the African legal context; and how to manage change among educational stakeholders while accounting for local realities?

This article proposes an offline-first architecture, a four-phase deployment plan spanning 36 months, governance grounded in the principles of trustworthy AI [2], and a change-management approach drawing on Kotter [3], Fullan [4], and UTAUT2 [5].

Choosing a school track is one of the most decisive choices in an individual's life course. According to Bourdieu and Passeron [1], schooling functions to confirm and maintain disparities by converting family economic and cultural advantages into valorized academic success, a phenomenon subsequently observed in similar African contexts.

In Côte d'Ivoire, the track chosen at the end of lower secondary school determines the higher-education pathways available, the peer network, and the self-perception of ability that the student develops. Geographic, socio-economic, and gender inequalities are documented to accumulate within this process.

It is within this context that the research program undertaken at INPHB in Yamoussoukro is situated. The first component, presented in an earlier publication [14], proposes a twelve-variable multinomial logistic regression model to recommend one of five target tracks, achieving 87% precision.

The second component, presented in our earlier work [15], proposes the Contextual Bayesian Model (MBC), which integrates five socio-contextual variables into the academic vector: household income quotient, socio-occupational category, geographic zone, digital access, and parental education level. This extension raises accuracy to 100% in hold-out and 97% in K=10 cross-validation (versus 80% and 83% for the logistic model), and reduces the share of unflagged ambiguous profiles from 45% to 0%.

Research on sociotechnical systems [6] is unequivocal: a technological system produces lasting impact only if its design integrates human, organizational, and technical dimensions. Three additional conditions for the MBC's success remain open.

The first is the complexity of technical deployment: an algorithm that performs well in simulation presupposes a robust infrastructure, which Rogers [7] describes as “adoption barriers related to facilitating conditions.”

The second is governance. Without bias-control mechanisms or transparency, a model such as the MBC risks reproducing, under the guise of mathematical objectivity, the very inequalities it is meant to correct [8,9].

The third is the human factor. Fullan [4] reminds us that, in an educational institution, change is not decreed but cultivated; user resistance remains the leading cause of failure in school digital transformations.

This article addresses three questions: how to adapt the MBC's technical architecture to Ivorian connectivity constraints; how to build ethical governance aligned with international standards; and how to manage change in the African context?

The article is organized as follows: Section 2 presents the operational implementation; Section 3, governance; Section 4, change management; Section 5, the integrated roadmap; and Section 6 concludes the article.

Fundamental Principle

Fundamental caveat: The MBC is a decision-support system, not an automated decision-making system.

Under no circumstances may an orientation be issued by the algorithm alone.

The final decision belongs to the guidance counselor, informed, but not replaced, by the model's outputs.

This principle is non-negotiable and constitutes the sine qua non condition of the system's ethical legitimacy.

2. Operational Implementation

2.1 Guiding Principles

Implementation of the MBC must respect four principles conditioning its robustness, drawn from the literature on the deployment of sociotechnical systems [6] and the diffusion of educational innovations [7]:

- Offline-first: the absence of connectivity is the default state; the system operates locally with deferred synchronization.
- Technological frugality: components must be locally accessible in terms of cost, availability, and maintenance.
- Contextual progressivity: deployment respects local institutional cycles.
- Interoperability: the system integrates with existing structures rather than creating new ones.

2.2 Technical Architecture: The Offline-First Model

2.2.1 Four functional components

Table 1: Offline-first architecture of the MBC adapted to connectivity constraints

Component	Main function	Recommended technologies	Operating mode
① Local data-collection module	Secure entry of academic data Xi and contextual data Ci; completeness validation of the vector $\Psi(Xi, Ci) \in \mathbb{R}^{17}$	Lightweight Android app; offline forms; encrypted storage (AES-256)	100% offline; synchronization via USB drive or occasional WiFi
② Embedded Bayesian engine	Embedded Python (scikit-learn); exported pre-trained model; Gaussian approximation	Embedded Python (scikit-learn, version pinned across server and tablets); exported pre-trained model (.pkl); Gaussian approximation (GaussianNB, playing a role analogous to a Laplace approximation)	Works without internet; sequential model update at the end of each annual cohort
③Adaptedcounselor interface	Tablet dashboard; CI visualization; printable sheet for families	React Native; local PDF export; French-language interface	Fully offline; local printing via USB printer
④Synchronization module	Deferred transmission of anonymized data once a connection is available; central model update	REST API (OAuth 2.0, TLS 1.3); version-conflict management	Automatic as soon as WiFi is detected; manual synchronization via USB drive if necessary

2.2.2 Processing flow for a student file

Processing of each file follows a precise sequence ensuring traceability and reversibility:

1. Collection and completeness validation of the vector $\Psi(Xi, Ci) \in \mathbb{R}^{17}$; otherwise the protocol described in Section 2.3 is triggered.
2. Construction of the augmented vector $\Psi(Xi, Ci)$ with weights αk learned through cross-validation.
3. Bayesian inference: computation of $P^*(yi=c \mid Xi, Ci)$ by Gaussian approximation; identification of c^* and of $CI(i, c^*)$.
4. Alert classification according to the four-level CI protocol.
5. Differentiated feedback to the counselor: recommendation, comparative profile, family sheet.
6. Time-stamped logging for traceability and annual sequential updating.

2.3 Adaptation of the Contextual Variables Ci to the Ivorian Context

The five variables of the vector Ci = (qi, si, zi, ni, ei) are redefined for the Ivorian context, in the absence of centralized institutional sources:

Table 2: Adaptation of the contextual variables Ci to the Ivorian context

Variable	Label	Adaptation to the Ivorian context	Source and availability
qi	Estimated household income	1 = < 50K FCFA/month; 2 = 50–150K; 3 = 150–300K; 4 = 300–600K; 5 = > 600K. Default = median of zi	Annual enrollment form. Availability: Medium
si	Socio-occupational category	1 = farmer/craftsperson; 2 = informal trader; 3 = low-level formal employee; 4 = mid-level employee/civil servant; 5 = manager/executive	Enrollmentform. Availability: High
zi	Ivorian geographic zone	0 = rural/landlocked; 1 = secondary town; 2 = regional capital; 3 = Greater Abidjan	Residential address + municipality code. Availability: High
ni	Composite digital-access score	Score [0,1]: smartphone (×0.30) + regular internet (×0.30) + tablet/PC (×0.25) + electricity (×0.15)	4-item student questionnaire. Availability: Low to medium
ei	Parental education level	0 = none; 1 = primary; 2 = BEPC/CEPE; 3 = Baccalaureate; 4 = Higher education (highest level attained by either parent)	Enrollmentform. Availability: High

The Ivorian version incorporates a gender variable $g_i \in \{0,1\}$ from the first version onward, motivated by the gender biases documented [10] in science tracks. g_i is meant to correct documented biases, not create new ones; its use is audited by the Governance Committee.

These adaptations change the coding of q_i and n_i relative to the model's initial formalization and require a re-estimation of the priors and of the weights α_k on Ivorian data during Phase 0. With g_i, the vector becomes $\Psi'(X_i, C_i, g_i) \in \mathbb{R}^{18}$; references to $\Psi \in \mathbb{R}^{17}$ refer to the model's initial reference version.

2.4 Handling of Missing Data

The MBC has native robustness to missing data through the contextual Bayesian prior. The following protocol complements it:

Table 3: Protocol for handling missing data in the MBC system

Situation	Mechanism activated	Impact on CI(i,c*)
Complete Ci vector	Standard Bayesian inference	CI calculated normally
1 missing Ci variable	Imputation using the modal value of zi; +15% inflation of σc	Slightly reduced CI; alert threshold unchanged
2 to 3 missing Ci variables	"Reinforced CI" mode: alert threshold raised from 0.50 to 0.65; explicit note on the counselor's sheet	Alert thresholdraised to 0.65
4 to 5 missing Ci variables	Degraded mode: recommendation based on Xi alone; systematic counselor alert	Mandatorycounseloralert
Incomplete academic variables Xi	Suspension of the automatic recommendation; partial profile forwarded	No recommendationproduced

2.5 Progressive Deployment Plan

Rogers [7] shows that the successful diffusion of an innovation follows phases of experimentation, evaluation, and progressive adoption. The proposed plan incorporates this principle:

Table 4: Progressive deployment plan for the MBC over 36 months

Phase	Horizon	Scope	Priority actions	Progression criteria
Phase 0: Pilot	M0–M6	4 volunteer high schools: 2	Installation of offline tablets; N1+N2	Precision ≥ 88%, 0 major data incidents,

Phase	Horizon	Scope	Priority actions	Progression criteria
		in Abidjan (contrasting social profiles), 1 secondary town, 1 rural area	training for pilot sites; MBC awareness campaign; feedback collection	counselor satisfaction ≥ 6/10, Ci coverage ≥ 60%
Phase 1: Expansion	M7–M18	20% of public high schools, with regional diversity represented	Offline industrialization; adjustment of regional priors; first audits; interim report	Precision ≥ 92%, Ci coverage ≥ 75%, measurable reduction in the gender orientation gap
Phase 2: Generalization	M19–M36	Full network of public high schools + partner institutions	Standardization and interoperability; regional dashboards; public equity report	K=10 accuracy ≥ 97%, 100% of profiles with CI < 0.5 reviewed, posterior variance under control
Phase 3: Continuousimprovement	Ongoing	Entire system	Inter-cohort updates; extension to middle schools; 5-year longitudinal research	Organizational maturity indicators achieved and maintained

3. Governance of the MBC System

3.1 Why Governance Is Essential

Three reasons make governance essential, beyond mere regulatory compliance.

The first is the risk of bias amplification: if the data reflect a historical over-orientation of disadvantaged students, the Bayesian prior will encode it [11]. Without active detection and correction, the MBC risks reinforcing inequalities under the guise of objectivity.

The second is legal risk: systems that influence individual trajectories are subject to growing transparency obligations, and a deployment without an explanation procedure exposes the project to legal risk and a loss of legitimacy.

The third is the risk of loss of trust: a single incident or a biased recommendation can durably destroy families' trust [12].

3.2 Algorithmic Ethics: Five Principles

Ethical governance rests on five principles drawn from the Guidelines for Trustworthy AI [2], adapted to the African context:

Table 5: Five principles of algorithmic ethics, implementation, and monitoring indicators

Principle	Operational definition	Implementation in the MBC	Monitoring indicator
Cultural transparency	Stakeholders understand how the system works and the origin of its recommendations, regardless of their level of education	Accessible documentation; annual report; adapted information sheets; oral presentation possible in the local language	% of families reporting they understand the recommendation ≥ 65%
Individualexplainability	Each recommendation can be explained in terms understandable to a non-specialist	Mandatory personalized sheet: contributing variables in plain language, CI, alternative tracks	% of sheets rated clear by families ≥ 70%
Multi-dimensionalfairness	The system actively corrects historical biases and does not discriminate on the basis of geographic zone, socio-occupational category, parental education level, or gender	Monthly audit by socio-occupational category, zone, and gender; alert if gap > 10 points	Reduction of the disadvantaged/advantaged orientation gap ≥ 15 points over 3 years
Human accountability	Identified human actors are responsible for final decisions and can be held accountable for them	The counselor validates each recommendation; the Committee is accountable for performance; public annual report	100% of orientations traceable to the validating counselor
Temporal robustness	The system operates reliably over time and resists performance drift (concept drift)	Semi-annual out-of-sample tests; drift detection; retraining if degradation > 3 points	Precision stable within ± 2 points over 3 consecutive cohorts

3.3 Governance Committee

The governance of the MBC cannot rest on a single actor. A multidisciplinary Governance Committee is essential to reconcile technical rigor, regulatory compliance, user representation, and institutional legitimacy:

Table 6: Composition and mandate of the MBC Governance Committee

Member	Required profile	Main mandate	Frequency
Institutional representative (Ministry in charge of Education)	Director of Secondary Education or designated representative	Roadmap validation; budget arbitration	Quarterly
Compliance officer (Data protection)	Legal expert in data protection	Compliance monitoring; management of access rights; liaison with the competent authority	Mandatorymonthly
Algorithm lead (INPHB)	Researcher/engineer, author of the MBC	Performance monitoring; drift detection; publication of reports	Mandatorymonthly
Representative of the guidance counselors	Experienced counselor, elected by peers	Reporting of borderline cases with CI < 0.5; training needs	Quarterly
Representative of parents	Elected parent, official body	Citizen oversight; validation of explanation procedures	Quarterly
Independent AI ethics expert	Independent ethics researcher	Independent bias audit; public annual report	Annual

3.4 Monitoring and Correction of Algorithmic Bias

3.4.1 Four types of bias to monitor

The MBC is designed to reduce orientation biases, but can itself produce them if training data or parameters are not monitored [8]:

- Historicity bias: inverse weighting of historical frequency in the sequential update.
- Geographic bias: deliberate oversampling of rural profiles at each pilot phase.
- Gender bias [10], pronounced in science tracks: integration of $g_i \in \{0,1\}$ into Ci from the Pilot Phase onward; semi-annual audit.
- Confirmation bias: reduced weighting of CI < 0.50 cases in the sequential update.

3.4.2 Monitoring dashboard

Table 7: MBC algorithmic bias monitoring dashboard

Indicator	Alert threshold	Frequency	Corrective action
Parity of recommendations toward selective tracks: gap between extreme socio-occupational categories	Gap > 15 points	Monthly	Review of weights αk; referral to the Governance Committee
Model precision in rural areas (zi = 0)	Rural precision< 85%	Quarterly	Oversampling of the rural cohort; adjustment of rural σc
Ratio of CI < 0.5 alerts: disadvantaged / advantaged profiles	Ratio > 2.5×	Monthly	Review of CI thresholds by context; strengthened Ci data collection
Model drift (concept drift)	Degradation > 3 points over 2 cohorts	Annual	Partial retraining; review of Ci variables
Gender bias (science-track recommendations, controlling for performance)	Gap > 10 points between genders at equal performance	Semi-annual	Dedicated audit; review of the treatment of the gi variable

4. Change Management

4.1 Theoretical Foundations

Change management is, together with governance, the most critical dimension of AI projects in education. Two complementary theoretical frameworks structure the approach.

Kotter's [3] eight-step model structures institutional transformation, from creating a sense of urgency to anchoring the change culturally. Projects typically fail when the guiding coalition or the final anchoring step is skipped.

The UTAUT2 model [5] identifies the determinants of usage intention, performance, effort, social influence, facilitating conditions, motivation, value, habit, explaining 74% of behavioral variance versus 56% for UTAUT.

Fullan [4] reminds us that, in education, change is cultivated rather than decreed.

4.2 Transformation of the Guidance Counselor's Role

4.2.1 An augmented role, not an eliminated one

Counselors' primary fear is disintermediation, a legitimate concern to be taken seriously. The MBC enriches the counselor's role rather than eliminating it:

Table 8: Transformation of the guidance counselor's role with the MBC

Dimension	Before the MBC	With the MBC	Net change
Cognitive load	Manual analysis of	Automatic identification	Reduced for simple cases,

Dimension	Before the MBC	With the MBC	Net change
	each file, with no prioritization support	of complex cases (CI < 0.5; 33% of profiles); other cases handled more efficiently	concentrated on the complex cases that truly need it
Sources of information	Intuition, yearly grades, interview	Intuition enriched with 17+ variables and explicit probabilities	Broadened and made more objective
Flagging of uncertain profiles	Depends on the counselor's experience	Profiles with CI < 0.5 automatically flagged (33% of profiles)	Multiplied sixfold — major impact on equity
Visibility of implicitbiases	Biases difficult to identify	Biases made visible through the weights αk and the audits	Tool for professionalreflexivity
Decision-making responsibility	Full but often solitary	Shared collegially for CI < 0.35	Maintained, better supported

4.2.2 New skills required

Effective use of the MBC requires new skills in three categories:

- Analytical skills: reading probabilities and CI(i,c*) values and their thresholds.
- Regulatory skills: families' rights regarding personal data.
- Interpersonal skills: explaining a recommendation, handling a dispute.

4.3 Protocol for Using the Confidence Index (CI)

CI(i, c*) is the main signal for the counselor-MBC dialogue. Four levels of action are defined:

Table 9: Counselor action protocol according to the four levels of CI (i, c*)

Level	CI value	Signal	Counselor action	Mandatory documentation
Strong recommendation	CI ≥ 0.80	Convergent academic and contextual profile	Short interview: checking buy-in, presenting the track	Simple validation in the digital file
Moderaterecommendation	0.50 ≤ CI < 0.80	Likely orientation with contextual uncertainty	In-depth interview: exploring the Ci variables with the family	Interview note + confirmation or reasoned adjustment
Orange alert	0.35 ≤ CI < 0.50	Ambiguous profile, insufficient data	Multi-stakeholder interview; documented collegial decision	Report of the collegial decision, signed by the counselor and the MBC lead

Level	CI value	Signal	Counselor action	Mandatory documentation
Red alert	CI < 0.35	Complex profile, insufficient data	Referral to the multidisciplinary committee; reasoned human decision	Complete multidisciplinary report + minimum 5-year archiving

Fundamental principle*: a low CI (CI < 0.5) is not a model failure.*

It is a signal that a profile deserves heightened human attention, 33% of profiles in the ESATIC validation, a rate the logistic model was unable to flag.

4.4 Communication with Families

4.4.1 Communication principles adapted to the African context

Communication with families is a precondition for trust in the system. In the African context, decisions involve extended-family dynamics and heterogeneous literacy levels. Threeprinciples are essential:

- Universal accessibility: communication understandable by all families, in the local language where necessary.
- Honesty about limitations: the MBC is not presented as infallible.
- Family subsidiarity: the MBC informs the decision, it does not make it.

4.4.2 Mandatory explanation sheet

Every recommendation is accompanied by an explanation sheet: contributing variables, CI value, recommended track and alternatives, referent counselor, dispute procedure.

Excerpt from a typical explanation sheet

Three main reasons for the recommendation:
① Outstanding academic results in key subjects
② Favorable family environment
③ Interpersonal aptitudes suited to the track

This recommendation is a decision aid, not a decision.
The family may lodge a dispute with the referent counselor within a set time frame.

4.5 Managing Institutional Resistance

Institutional resistance is predictable and can be overcome if anticipated [3,4]. Six typical forms of resistance and their response levers:

Table 10: Anticipated institutional resistance and response levers adapted to the Ivorian context

Observedresistance	Main actor	Source	Adapted response lever
“The algorithm will decide in my place and I will become useless”	Guidance counselors	Fear of disintermediation (UTAUT2)	CI < 0.5 triggers a mandatory human decision; document the time savings; showcase the skills gained
“The system will reinforce inequalities rather than correct them”	Unions, parent associations	Distrust rooted in the history of education systems	Share results on disadvantaged profiles; include parents on the Committee; publish the bias audit
“Our personal data will be used for other purposes”	All families	Distrust of public institutions	Clear communication about rights; guaranteed local hosting; right of access
“We have neither electricity nor internet — this system does not concern us”	Counselors in rural areas	Objective infrastructure reality	Demonstration of offline functioning; rural high schools included from M0; stand-alone kit if necessary
“This is a system designed for Abidjan, not for our reality”	Actors frominlandregions	Historical center–periphery distrust	Adjustment of regional priors from Phase 1 onward; local focal points; rural data included in the Pilot Phase
“Training takes time we do not have”	Overburdened counselors (high caseload ratio)	Professional burnout	Training integrated into the calendar; offline e-learning; valued certification

4.6 Training Program

A structured training program is a precondition for adoption of the MBC, avoiding training on the tool without explaining its underlying logic [4]:

Table 11: Four-level training program adapted to Ivorian constraints

Level	Duration	Target audience	Format adapted to the context	Priority content
Level 1: User	2 jours (14h)	All counselors at MBC-equipped institutions	1 day in person + 1 day offline e-learning	Interface, reading CI, alert protocol, families' rights, case studies
Level 2: MBC lead	4 jours (28h)	1 lead per MBC-equipped institution + 1 per regional directorate	Residential training at INPHB or a regional capital	Bayesian foundations [13]; interpretation of the αk weights; bias auditing
Level 3: National expert	≥ 4 days/year, ongoing	INPHB team + advanced volunteer counselors	Annual INPHB seminar + online community of practice	Model review; contribution to bias audits; publication of lessons learned
Leadership training	1 day	Principals and vice-principals of MBC-equipped institutions	Regional leadership seminar	Strategic vision; local oversight; handling family concerns; role of the MBC lead

5. Integrated Roadmap and Outlook

5.1 Interconnection of the Three Dimensions

The three dimensions addressed in this article are simultaneous and mutually conditioning [6]: performance depends on the joint optimization of the technical and human components.

A deployment without governance creates risks that destroy trust; governance without change management remains a dead letter; change management without adequate infrastructure is doomed to improvisation.

5.2 Integrated Roadmap

Table 12: Integrated 36-month roadmap: three parallel dimensions

Horizon	Operational implementation	Governance	Change management
M1–M3	Selection of pilot high	Formation of the	Training of pilot focal

Horizon	Operational implementation	Governance	Change management
Preparation	schools; equipment audit; offline configuration	Committee; usage charter; appointment of the compliance officer	points; communication materials
M4–M6 Pilot	Pilot deployment; Ci data collection; monitoring	First Committee meeting; initial bias audit	Training of all pilot counselors; sheets tested with families
M7–M12 Consolidation	Analysis of pilot results; adjustment of regional priors	Interimgovernance report	Satisfaction survey; training adjustment
M13–M18 Expansion	Expansion to 20% of public high schools	First independentexternal audit	Expansion of training; national communication
M19–M36 Generalization	Full network deployment; inter-cohort updates	Public annual performance and equity report	Community of practice; 5-year longitudinal research

5.3 Extension and Validation Perspectives

Definitive validation of the MBC requires real data from long cohorts. A five-year comparative study would measure the impact on the detection of under-orientation, the reorientation of disadvantaged profiles, the reduction of gender gaps, and student satisfaction.

Three extensions of the contextual vector are priorities: local labor-market indicators, geographic mobility data, and strengthened treatment of gi through SHAP values.

6. Conclusion

The Contextual Bayesian Model constitutes a robust algorithmic contribution: 100% accuracy in hold-out and 97% in K=10 cross-validation, explicit flagging of uncertain profiles, and native robustness to missing data. These results place the MBC among the best-documented AI-assisted orientation systems.

This article has shown that a high-performing algorithm is a necessary, but not sufficient, condition for a real impact on orientation inequalities.

The offline-first implementation makes it possible to deploy the MBC without a reliable connection, while maintaining algorithmic robustness and translating missing-data handling into an operational protocol [13].

Ethical governance rests on the five principles of the Guidelines for Trustworthy AI [2], adapted locally: cultural transparency, multidimensional fairness incorporating gender and

geography, human subsidiarity, and temporal robustness. The integration of gi reflects an ethical choice to correct documented biases [10].

Change management draws on Kotter [3], UTAUT2 [5], and Fullan [4] to structure anticipated resistance, tailored training, multilingual communication, and progressive deployment [7].

The deployment of the MBC raises a fundamental question: is a system that uses a student's socio-economic situation a tool of justice or a vehicle for reproducing inequalities?

The answer depends on governance. Properly monitored, the MBC is a tool of justice; without bias monitoring or a right to contest, it could reproduce historical inequalities under the apparent authority of mathematical objectivity. Governance and change management are therefore constitutive of its ethical promise.

Three calls are made: for experimentation on real data, for interdisciplinary collaboration, and for transparency about the results of pilot deployments.

School orientation is a right, not a privilege. The MBC, deployed with rigor, governance, and attentive change management, can help make it so for all students.

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