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# The Competency Paradox: Why Does a Competency-Based Curriculum Adhere to a Rigid, Time-Bound Educational Cycle? A Critical Inquiry

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***Abstract:*** *This mixed-methods study critically examined the competency paradox—the fundamental contradiction between competency-based education's (CBE) philosophical commitment to flexible, self-paced, mastery-based learning and its practical implementation within rigid, time-bound educational cycles governed by traditional academic calendars, predetermined course durations, and inflexible progression timelines. Conducted across 15 educational institutions in Uganda implementing competency-based curricula, the research employed a concurrent design involving 461 participants (180 educators, 200 students, 45 administrators, and 36 policy makers) selected through purposive sampling with adequate statistical power (80%) to detect small to medium effect sizes. The study's objectives were threefold: to identify institutional, economic, and regulatory factors constraining flexible CBE implementation; to examine stakeholder perceptions of the contradiction between CBE principles and time-bound practices; and to explore reconciliation strategies and transformative models. Quantitative data collected through structured questionnaires were analyzed using descriptive statistics, one-way ANOVA, Pearson correlation, multiple regression, and structural equation modeling (SEM), while qualitative data from 24 interviews, 6 focus groups, and 45 policy documents underwent thematic analysis using NVivo 12. Results revealed statistically significant perceptual divergences among stakeholder groups, with administrators and policy makers rating CBE implementation authenticity significantly higher than educators and students ($F=87.45$, $p<0.001$, $\eta^2=0.364$), indicating critical disconnect between decision-makers and practitioners. Multiple regression analysis demonstrated that institutional inertia ($\beta=0.298$), accreditation requirements ($\beta=0.246$), financial aid regulations ($\beta=0.221$), stakeholder resistance ($\beta=0.206$), faculty contract structures ($\beta=0.187$), and technological limitations ($\beta=0.143$) collectively explained 68% of variance in time-bound structure persistence ($R^2=0.679$, $F(6,454)=159.47$, $p<0.001$). Structural equation modeling with excellent fit indices (CFI=0.952, TLI=0.945, RMSEA=0.035) confirmed that regulatory environments ($\beta=0.418$), institutional cultures ($\beta=0.392$), and economic constraints ($\beta=0.337$) converged to create time-bound structures, which strongly predicted CBE implementation gaps ($\beta=0.756$, accounting for 57% of variance) that in turn produced significant negative effects on student outcomes ($\beta=-0.523$). Moderating effects of administrative support ($\beta=-0.287$) and faculty professional development ($\beta=-0.234$) suggested potential mitigation strategies within existing constraints. The study concluded that the competency paradox represents not implementation failure but a systemic phenomenon requiring coordinated reforms across policy, regulatory, and institutional levels. Key recommendations included comprehensive regulatory reform to replace time-based accountability with competency-based metrics, institutional restructuring encompassing contract renegotiation and technological infrastructure development, and development of sophisticated hybrid models that create authentic flexibility within constrained timeframes through mechanisms such as competency-based modules, flex periods, and inter-institutional consortia that distribute implementation costs and risks while expanding access to genuine mastery-based learning pathways.*

**Key Words: Competency-Based Curriculum**

## Introduction of the Study

The evolution of educational paradigms has witnessed a significant shift from traditional content-based approaches to competency-based education (CBE), which promises to revolutionize learning by focusing on the mastery of skills and knowledge rather than seat time. Competency-based curricula are designed to allow learners to progress at their own pace, demonstrating mastery before advancing to subsequent learning objectives (Fatimah et al., 2023; Prosper Mubangizi, 2020). This approach theoretically accommodates individual differences in learning speed, prior knowledge, and cognitive processing, thereby promoting equity and personalized learning experiences (Pepin et al., 2017; Su & Zhong, 2022). However, a fundamental contradiction emerges when examining the implementation of competency-based curricula in contemporary educational institutions: despite their philosophical foundation in flexible, learner-centered progression, these curricula remain largely constrained by traditional academic calendars, semester systems, and fixed timelines for completion. This paradox raises critical questions about the authenticity of competency-based education as currently practiced (Monica, 2022; Vergel et al., 2018). While the rhetoric of CBE emphasizes "learning at your own pace" and "mastery before progression," the reality in most educational settings involves predetermined course durations, semester-based assessments, and institutionally imposed deadlines that mirror traditional time-based education models (Putro, 2023; Ssentanda & Wenske, 2023). This study examines this apparent contradiction, exploring the structural, institutional, economic, and systemic factors that perpetuate time-bound constraints within supposedly competency-based educational frameworks. By interrogating this paradox, the research aims to contribute to a deeper understanding of the gap between CBE's theoretical promises

and its practical implementation, ultimately informing more authentic approaches to competency-based learning (Isaac Kazaara & Gracious Kazaara, 2024; Julius & Nelson, 2023).

**Background of the Study**

Competency-based education emerged as a response to the limitations of traditional educational models that equate learning with time spent in classrooms. The Carnegie Unit, established in the early 20th century, standardized education by measuring learning in terms of contact hours rather than actual learning outcomes (Franco et al., 2023; Jamil et al., 2020). This time-based approach has been criticized for privileging compliance over competence and for failing to accommodate diverse learning needs. In contrast, CBE focuses on clearly defined learning outcomes, allowing students to demonstrate mastery through various assessment methods and, theoretically, to progress as soon as they achieve competence regardless of time constraints (Gracious Kazaara & Kazaara, 2025). The global adoption of competency-based frameworks has accelerated in recent decades, driven by demands for accountability, workforce readiness, and personalized learning. International educational bodies, governments, and institutions have increasingly embraced competency frameworks, with notable implementations in medical education, vocational training, and K-12 systems (Charles et al., 2023; Julius & Isaac Kazaara, 2025). Research has documented CBE's potential benefits, including improved learning outcomes, increased student motivation, and better alignment between education and workforce demands. However, empirical studies have also revealed significant implementation challenges, including assessment complexities, resource constraints, and resistance from traditional institutional structures (Ndomondo et al., 2022; VERGUN et al., 2021).

Despite its promise, the practical implementation of CBE often involves significant compromises with traditional time-based structures. Educational institutions continue to operate within semester systems, academic years, and graduation timelines that impose temporal boundaries on learning (Kazaara, 2023; Victoria et al., 2023). These temporal constraints persist due to various factors: accreditation requirements, financial aid regulations tied to enrollment periods, institutional scheduling logistics, faculty contracts based on semester teaching loads, and societal expectations about educational progression (Chemutai et al., 2023; Ma et al., 2022). Consequently, many so-called competency-based programs function as hybrid models that retain substantial elements of time-based education, creating a gap between CBE's theoretical ideals and its operational reality (Jane & Isaac Kazaara, 2023; Suzan & Gracious Kazaara, 2023). This study is situated within this context of tension between CBE's philosophical foundations and its practical manifestations. While existing literature has examined various aspects of competency-based education implementation, there remains limited critical inquiry into the fundamental paradox of maintaining rigid temporal structures within frameworks explicitly designed to transcend them. Understanding this paradox is essential for educators, policymakers, and administrators seeking to implement more authentic forms of competency-based learning that genuinely prioritize mastery over time.

**Problem Statement**

Competency-based education was conceived as a transformative approach that would liberate learning from the artificial constraints of time, allowing students to progress based on demonstrated mastery rather than predetermined schedules. However, the contemporary implementation of competency-based curricula reveals a significant contradiction: educational institutions continue to impose rigid, time-bound cycles—including fixed semester lengths, predetermined course durations, and inflexible academic calendars—that fundamentally undermine the core principles of competency-based learning (Aheisibwe & Barigye, 2023; Muwanguzi et al., 2023). This paradox creates several critical problems. First, it compromises the integrity of competency-based education by reintroducing the very time-based constraints that CBE was designed to eliminate, thereby limiting its potential to accommodate diverse learning paces and promote genuine mastery (Julius & Mategeko, 2025; Julius & Sula, 2025a, 2025b). Second, it creates confusion among stakeholders about what competency-based education truly means, as the gap between rhetoric and reality erodes confidence in the model. Third, it may disadvantage learners who could benefit most from flexible progression, including those who need additional time for mastery or those who could accelerate through content they have already mastered (Katurebe & Nalukwago, 2024; Mubaraka, 2023). Finally, this contradiction represents a significant inefficiency in educational resource allocation, as institutions invest in developing competency frameworks while simultaneously maintaining parallel time-based structures. Despite the prevalence of this paradox in educational practice, there has been insufficient critical examination of why this contradiction persists and what factors—structural, economic, cultural, or political—sustain it. Without understanding the root causes of this paradox, efforts to implement more authentic competency-based education will continue to face the same constraints that currently limit its effectiveness. This study addresses this gap by critically investigating the factors that perpetuate time-bound structures within competency-based curricula and exploring the implications of this paradox for learners, educators, and educational systems.

**Main Objective of the Study**

To critically examine the factors that perpetuate rigid, time-bound educational cycles within competency-based curricula and to analyze the implications of this paradox for the authenticity and effectiveness of competency-based education.

**Specific Objectives**

1. To identify and analyze the institutional, economic, and regulatory factors that constrain the implementation of truly flexible, self-paced progression in competency-based curricula.
2. To examine stakeholder perceptions (including educators, administrators, and students) regarding the contradiction between competency-based principles and time-bound implementation practices.

3. To explore potential models and strategies for reconciling competency-based learning principles with existing educational structures, or for transforming these structures to better align with CBE's foundational philosophy.

**Research Questions**

1. What institutional, economic, regulatory, and cultural factors contribute to the maintenance of rigid, time-bound structures within competency-based curricula, and how do these factors interact to sustain the competency paradox?
2. How do key stakeholders (educators, administrators, and students) perceive and experience the contradiction between competency-based principles and time-bound implementation, and what do they identify as the primary barriers to more flexible, authentic competency-based progression?
3. What alternative models, innovative practices, or structural reforms might enable educational institutions to implement competency-based curricula that genuinely prioritize mastery over time, and what conditions would be necessary for such transformations to succeed?

**Methods.**

This study employed a concurrent mixed-methods research design to critically examine the competency paradox within educational institutions implementing competency-based curricula. The research was conducted across 15 purposively selected educational institutions in Uganda that claimed to utilize competency-based approaches, including 8 secondary schools, 4 tertiary institutions, and 3 universities. A sample size of 384 participants was calculated using Cochran's formula at 95% confidence level and 5% margin of error, with an additional 20% buffer for non-response, yielding a final sample of 461 participants comprising 180 educators, 200 students, 45 curriculum administrators, and 36 policy makers. This sample size was sufficient to detect small to medium effect sizes (Cohen's d = 0.3-0.5) with 80% statistical power. Quantitative data were collected through structured questionnaires utilizing a 5-point Likert scale to measure perceptions of competency-based implementation, time-bound constraints, and institutional flexibility, while qualitative data were gathered through 24 in-depth semi-structured interviews with key informants and 6 focus group discussions with 8-10 participants each. Document analysis was conducted on 45 institutional policy documents, curriculum frameworks, and academic calendars to triangulate findings. Quantitative data were analyzed using SPSS version 26, employing descriptive statistics (frequencies, percentages, means, and standard deviations), inferential statistics including independent samples t-tests and one-way ANOVA to compare perceptions across stakeholder groups, Pearson correlation analysis to examine relationships between variables, and multiple regression analysis to identify predictors of the competency paradox, with statistical significance set at $p<0.05$. Qualitative data were analyzed thematically using NVivo 12 software through a six-phase process involving familiarization, code generation, theme identification, theme review, theme definition, and report production, ensuring credibility through member checking and peer debriefing. Structural Equation Modeling (SEM) was employed to test the complex relationships between institutional factors, regulatory constraints, economic pressures, and the persistence of time-bound structures within competency-based frameworks, with model fit assessed using chi-square statistics, Comparative Fit Index (CFI>0.90), Tucker-Lewis Index (TLI>0.90), and Root Mean Square Error of Approximation (RMSEA<0.08). Integration of quantitative and qualitative findings occurred during interpretation through a convergent design matrix that identified areas of convergence, divergence, and expansion between datasets. Ethical approval was obtained from the relevant institutional review boards, and informed consent was secured from all participants, with confidentiality maintained through coding and secure data storage, while validity was enhanced through triangulation of multiple data sources and methods, and reliability was established through pilot testing of instruments (Cronbach's alpha >0.70 for all scales) and inter-coder reliability assessment (Cohen's kappa >0.80) for qualitative analysis (Nelson et al., 2022, 2023).

**Results**

**Table 1: Descriptive Statistics and Comparative Analysis of Stakeholder Perceptions on Competency-Based Implementation and Time-Bound Constraints**

| Variable | Educators (n=180) Mean±SD | Students (n=200) Mean±SD | Administrators (n=45) Mean±SD | Policy Makers (n=36) Mean±SD | F-value | p-value | Effect Size ($\eta^2$) |
|---|---|---|---|---|---|---|---|
| **Perception of CBE Implementation Authenticity** | 2.34±0.82 | 2.67±0.91 | 3.78±0.65 | 3.92±0.58 | 87.45 | <0.001 | 0.364 |
| **Experience of Time-Bound Constraints** | 4.23±0.67 | 4.45±0.58 | 3.12±0.89 | 2.87±0.95 | 112.34 | <0.001 | 0.423 |
| **Institutional Flexibility in Progression** | 2.01±0.76 | 1.89±0.83 | 2.98±0.71 | 3.23±0.69 | 68.92 | <0.001 | 0.312 |
| **Alignment Between CBE Principles and Practice** | 2.15±0.88 | 2.43±0.95 | 3.45±0.77 | 3.67±0.62 | 79.23 | <0.001 | 0.341 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Economic Pressure as Implementation Barrier** | 4.12±0.71 | 3.89±0.84 | 4.34±0.59 | 4.28±0.63 | 8.45 | <0.001 | 0.052 |
| **Regulatory Constraints Impact** | 4.31±0.64 | 3.67±0.89 | 4.56±0.51 | 4.61±0.48 | 35.67 | <0.001 | 0.189 |
| **Cultural/Traditional Expectations Influence** | 3.98±0.79 | 4.01±0.81 | 3.87±0.73 | 3.94±0.68 | 0.67 | 0.571 | 0.004 |
| **Willingness to Adopt Flexible Models** | 3.67±0.93 | 4.23±0.72 | 2.89±0.97 | 2.76±1.02 | 56.78 | <0.001 | 0.271 |

*Note: Ratings on 5-point Likert scale (1=Strongly Disagree, 5=Strongly Agree). Post-hoc Tukey HSD tests revealed significant differences ($p<0.05$) between all stakeholder groups except where indicated.*

The one-way ANOVA results revealed statistically significant differences across stakeholder groups for seven out of eight measured variables, indicating substantial divergence in how different actors within the educational system perceived and experienced the competency paradox. The most pronounced differences emerged in perceptions of CBE implementation authenticity ($F=87.45$, $p<0.001$, $\eta^2=0.364$) and experiences of time-bound constraints ($F=112.34$, $p<0.001$, $\eta^2=0.423$), both demonstrating large effect sizes according to Cohen's conventions. Post-hoc Tukey HSD tests indicated that administrators and policy makers rated CBE implementation authenticity significantly higher ($M=3.78\pm0.65$ and $M=3.92\pm0.58$ respectively) compared to educators ($M=2.34\pm0.82$) and students ($M=2.67\pm0.91$), with all pairwise comparisons reaching statistical significance ($p<0.001$). Conversely, educators and students reported significantly higher experiences of time-bound constraints ($M=4.23\pm0.67$ and $M=4.45\pm0.58$) compared to administrators and policy makers ($M=3.12\pm0.89$ and $M=2.87\pm0.95$), suggesting a critical disconnect between those who design and oversee competency-based systems and those who directly experience their implementation. The only variable that did not demonstrate significant differences across groups was cultural/traditional expectations influence ($F=0.67$, $p=0.571$, $\eta^2=0.004$), indicating universal recognition across all stakeholder categories that societal norms and expectations played a role in maintaining time-bound structures, regardless of one's position within the educational hierarchy.

The stark disparity between stakeholder perceptions revealed a fundamental disconnect in understanding the competency paradox, with those furthest from direct classroom implementation holding the most optimistic views about CBE authenticity while simultaneously underestimating the severity of time-bound constraints. This finding was particularly concerning because it suggested that decision-makers who possessed the authority to modify institutional structures were least aware of the practical contradictions undermining competency-based principles. The administrators' and policy makers' significantly higher ratings of implementation authenticity (approaching 4 on the 5-point scale) stood in direct contradiction to educators' and students' ratings (hovering around 2.3-2.7), indicating that institutional leadership either lacked accurate information about ground-level realities or maintained different criteria for what constituted "authentic" CBE implementation. This perception gap aligned with organizational theory regarding hierarchical information asymmetry, where vertical distance within institutions often correlates with decreased accuracy in understanding operational challenges. The moderate to large effect sizes ($\eta^2=0.312$-$0.423$) for most variables indicated that stakeholder group membership accounted for substantial variance in perceptions, suggesting that position within the educational system fundamentally shaped one's understanding of the competency paradox rather than mere individual differences in opinion.
The universal acknowledgment of economic pressures and regulatory constraints as significant barriers (means ranging from 3.89 to 4.61 across groups) provided crucial insight into the structural factors sustaining the competency paradox. All stakeholder groups, regardless of their divergent views on implementation authenticity, converged in recognizing that external economic and regulatory factors imposed substantial limitations on flexible, self-paced progression. The particularly high ratings from administrators and policy makers regarding regulatory constraints ($M=4.56\pm0.51$ and $M=4.61\pm0.48$) suggested that even those most optimistic about current implementation recognized systemic barriers beyond their institutional control, including accreditation requirements, financial aid regulations tied to enrollment periods, and governmental education policies structured around academic calendars. The finding that cultural and traditional expectations showed no significant differences across groups ($p=0.571$) while simultaneously receiving moderately high ratings (means 3.87-4.01) indicated a shared understanding that societal norms about educational progression—including parental expectations, employer preferences for traditional credentials, and cultural conceptions of academic achievement—created powerful conservative forces resisting fundamental structural change. Most revealing was the significant difference in willingness to adopt flexible models, where students showed highest enthusiasm ($M=4.23\pm0.72$) while administrators and policy makers demonstrated considerably less willingness ($M=2.89\pm0.97$ and $M=2.76\pm1.02$), suggesting that despite recognizing barriers, institutional leadership exhibited risk aversion or practical concerns about implementing truly flexible competency-based models that would require dismantling established temporal structures.

**Table 2: Correlation Matrix and Regression Analysis of Factors Contributing to Time-Bound Structure Persistence**

| **Variables** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
|---|---|---|---|---|---|---|---|
| 1. Time-Bound Structure Persistence | 1.000 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2. Institutional Inertia | 0.687** | 1.000 | | | | | |
| 3. Financial Aid Regulations | 0.612** | 0.543** | 1.000 | | | | |
| 4. Faculty Contract Structures | 0.598** | 0.621** | 0.467** | 1.000 | | | |
| 5. Accreditation Requirements | 0.651** | 0.589** | 0.612** | 0.534** | 1.000 | | |
| 6. Technological Infrastructure Limitations | 0.512** | 0.478** | 0.389** | 0.423** | 0.445** | 1.000 | |
| 7. Stakeholder Resistance to Change | 0.634** | 0.712** | 0.498** | 0.567** | 0.523** | 0.456** | 1.000 |

**Multiple Regression Analysis Results**

| Predictor Variable | B | SE | β | t | p | VIF |
|---|---|---|---|---|---|---|
| (Constant) | 0.423 | 0.187 | - | 2.262 | 0.024 | - |
| Institutional Inertia | 0.312 | 0.056 | 0.298 | 5.571 | <0.001 | 2.34 |
| Financial Aid Regulations | 0.245 | 0.061 | 0.221 | 4.016 | <0.001 | 1.98 |
| Faculty Contract Structures | 0.198 | 0.058 | 0.187 | 3.414 | 0.001 | 2.12 |
| Accreditation Requirements | 0.267 | 0.059 | 0.246 | 4.525 | <0.001 | 2.05 |
| Technological Infrastructure Limitations | 0.156 | 0.052 | 0.143 | 3.000 | 0.003 | 1.67 |
| Stakeholder Resistance to Change | 0.223 | 0.063 | 0.206 | 3.540 | <0.001 | 2.41 |

*Model Summary: $R=0.824$, $R^2=0.679$, Adjusted $R^2=0.674$, $F(6,454)=159.47$, $p<0.001$*

*Note: *$p<0.01$; VIF=Variance Inflation Factor; All VIF values <3.0 indicating no multicollinearity concerns*

The correlation analysis revealed that all six predictor variables demonstrated statistically significant positive relationships with time-bound structure persistence at the $p<0.01$ level, with correlation coefficients ranging from moderate to strong ($r=0.512$ to $r=0.687$). The strongest individual correlation emerged between institutional inertia and time-bound structure persistence ($r=0.687$, $p<0.001$), followed closely by accreditation requirements ($r=0.651$, $p<0.001$) and stakeholder resistance to change ($r=0.634$, $p<0.001$), suggesting these factors exerted the most direct influence on maintaining rigid temporal structures within competency-based curricula. The intercorrelations among predictor variables ranged from $r=0.389$ to $r=0.712$, indicating substantial relationships among the independent variables themselves, though Variance Inflation Factor (VIF) values all remained below 3.0 (range: 1.67-2.41), confirming that multicollinearity did not compromise the regression model's validity. The multiple regression analysis produced a robust model ($R^2=0.679$, Adjusted $R^2=0.674$) that accounted for approximately 68% of the variance in time-bound structure persistence, with the overall model achieving high statistical significance ($F(6,454)=159.47$, $p<0.001$). All six predictor variables contributed significantly to the model, with institutional inertia emerging as the strongest predictor ($\beta=0.298$, $t=5.571$, $p<0.001$), followed by accreditation requirements ($\beta=0.246$, $t=4.525$, $p<0.001$), financial aid regulations ($\beta=0.221$, $t=4.016$, $p<0.001$), stakeholder resistance to change ($\beta=0.206$, $t=3.540$, $p<0.001$), faculty contract structures ($\beta=0.187$, $t=3.414$, $p=0.001$), and technological infrastructure limitations ($\beta=0.143$, $t=3.000$, $p=0.003$).

The regression model's substantial explanatory power (68% of variance explained) provided compelling evidence that the competency paradox resulted from a complex interplay of structural, regulatory, economic, and cultural factors rather than any single cause, validating the study's theoretical framework that positioned the paradox as a multi-dimensional phenomenon requiring systemic analysis. The emergence of institutional inertia as the strongest predictor was particularly revealing, as it suggested that organizational resistance to change—rooted in established procedures, risk aversion, sunk costs in existing systems, and comfort with familiar structures—constituted the primary obstacle to implementing truly flexible competency-based models. This finding aligned with institutional theory's emphasis on isomorphism and path dependency, where organizations tend to maintain existing structures even when those structures conflict with stated goals or emerging best practices. The statistical significance of accreditation requirements as the second-strongest predictor ($\beta=0.246$) highlighted how external regulatory bodies, despite sometimes endorsing competency-based principles rhetorically, imposed operational requirements (such as minimum course lengths, semester-based reporting, and credit hour equivalencies) that effectively mandated time-bound structures, creating a regulatory double bind where institutions could not achieve full CBE implementation while maintaining accreditation compliance under current frameworks.

The moderate but significant contributions of financial aid regulations ($\beta=0.221$) and faculty contract structures ($\beta=0.187$) illuminated how economic systems and labor arrangements embedded temporal assumptions that resisted easy modification even when institutional leadership desired change. Financial aid systems in most jurisdictions distributed resources based on enrollment periods and required students to maintain minimum enrollment intensities measured in credit hours per term, effectively penalizing or rendering ineligible students who wished to accelerate or decelerate their learning pace according to competency mastery. Similarly, faculty contracts typically specified teaching loads in terms of courses per semester and contact hours per week, creating labor cost structures predicated on predictable, synchronized cohorts of students moving through predetermined course sequences—a model fundamentally incompatible with individualized, self-paced progression. The relatively weaker but still significant contribution of technological infrastructure limitations ($\beta=0.143$) suggested that while technology posed practical challenges to tracking individualized progression and managing asynchronous learning at scale, these technical barriers were less determinative than institutional, regulatory, and economic factors, implying that technological solutions alone would prove insufficient without addressing the more fundamental structural impediments. The significant role of stakeholder resistance to change ($\beta=0.206$)

underscored that beyond formal institutional structures, informal cultural factors including educators' concerns about workload implications, parents' anxieties about non-traditional progression models, and students' own socialization into conventional educational timelines created human-centered resistance that would require extensive change management efforts, professional development, and stakeholder engagement to overcome successfully.

**Table 3: Structural Equation Modeling Results for the Competency Paradox Framework**

| Path Relationships | Standardized Coefficient (β) | SE | CR | p | Hypothesis |
|---|---|---|---|---|---|
| **Direct Effects** | | | | | |
| Regulatory Environment → Time-Bound Structures | 0.418 | 0.062 | 6.742 | <0.001 | Supported |
| Economic Constraints → Time-Bound Structures | 0.337 | 0.058 | 5.810 | <0.001 | Supported |
| Institutional Culture → Time-Bound Structures | 0.392 | 0.061 | 6.426 | <0.001 | Supported |
| Time-Bound Structures → CBE Implementation Gap | 0.756 | 0.048 | 15.750 | <0.001 | Supported |
| CBE Implementation Gap → Student Outcomes | -0.523 | 0.055 | -9.509 | <0.001 | Supported |
| **Indirect Effects** | | | | | |
| Regulatory Environment → CBE Implementation Gap | 0.316 | 0.049 | 6.449 | <0.001 | Supported |
| Economic Constraints → CBE Implementation Gap | 0.255 | 0.045 | 5.667 | <0.001 | Supported |
| Institutional Culture → CBE Implementation Gap | 0.296 | 0.048 | 6.167 | <0.001 | Supported |
| Regulatory Environment → Student Outcomes | -0.165 | 0.031 | -5.323 | <0.001 | Supported |
| Economic Constraints → Student Outcomes | -0.133 | 0.028 | -4.750 | <0.001 | Supported |
| Institutional Culture → Student Outcomes | -0.155 | 0.030 | -5.167 | <0.001 | Supported |
| **Moderating Effects** | | | | | |
| Administrative Support × Time-Bound Structures | -0.287 | 0.053 | -5.415 | <0.001 | Supported |
| Faculty Professional Development × Institutional Culture | -0.234 | 0.048 | -4.875 | <0.001 | Supported |

**Model Fit Indices:**

- $\chi^2(247) = 386.54$, $p<0.001$
- $\chi^2/df = 1.565$
- CFI = 0.952
- TLI = 0.945
- RMSEA = 0.035 (90% CI: 0.029-0.042)
- SRMR = 0.041
- PCLOSE = 0.998

*Note: CR=Critical Ratio; SE=Standard Error; CFI=Comparative Fit Index; TLI=Tucker-Lewis Index; RMSEA=Root Mean Square Error of Approximation; SRMR=Standardized Root Mean Square Residual*

The structural equation model demonstrated excellent fit to the observed data across all assessed indices, with the chi-square to degrees of freedom ratio ($\chi^2/df=1.565$) falling well below the recommended threshold of 3.0, indicating that the hypothesized model appropriately captured the relationships among variables. The Comparative Fit Index (CFI=0.952) and Tucker-Lewis Index (TLI=0.945) both exceeded the conventional cutoff of 0.90, suggesting that the specified model explained substantially more variance than a baseline independence model. Most compellingly, the Root Mean Square Error of Approximation (RMSEA=0.035, 90% CI: 0.029-0.042) indicated excellent model fit, falling well below the 0.05 threshold for close fit, with the PCLOSE value of 0.998 providing strong evidence that the model fit the population data closely. The Standardized Root Mean Square Residual (SRMR=0.041) similarly indicated excellent fit, remaining below the 0.05 cutoff. All hypothesized paths achieved statistical significance at $p<0.001$, with critical ratios exceeding ±1.96, providing robust support for the theoretical framework. The direct effects revealed that regulatory environment exerted the strongest influence on time-bound structures ($\beta=0.418$, CR=6.742, $p<0.001$), followed by institutional culture ($\beta=0.392$, CR=6.426, $p<0.001$) and economic constraints ($\beta=0.337$, CR=5.810, $p<0.001$). The relationship between time-bound structures and CBE implementation gap was particularly strong ($\beta=0.756$, CR=15.750, $p<0.001$), indicating that rigid temporal constraints accounted for approximately 57% of the variance in the gap between competency-based principles and actual practice, representing a large effect size that positioned time-bound structures as the proximal mechanism through which distal factors undermined CBE authenticity.

The SEM results provided sophisticated evidence for a cascading causal model in which external and internal organizational factors converged to create and maintain time-bound structures, which in turn generated substantial gaps between competency-based principles and implementation, ultimately producing measurable negative effects on student outcomes. The strong direct effect of

time-bound structures on CBE implementation gap (β=0.756) constituted the study's most critical finding, as it empirically validated the theoretical premise that rigid temporal constraints represented not merely an operational inconvenience but rather a fundamental barrier that prevented authentic competency-based education from materializing in practice. This effect size suggested that institutions could not achieve genuine CBE implementation—characterized by truly flexible, self-paced progression and mastery-based advancement—while simultaneously maintaining traditional academic calendars, predetermined course durations, and synchronized cohort progression. The significant negative relationship between CBE implementation gap and student outcomes (β=-0.523, CR=-9.509, p<0.001) provided empirical evidence that this paradox carried tangible consequences for learners, indicating that students in systems with larger gaps between CBE rhetoric and reality experienced measurably worse outcomes, likely because they neither benefited from CBE's promised flexibility nor from the clarity and structure of traditional time-based models, instead experiencing a confusing hybrid that delivered the disadvantages of both approaches without the advantages of either.

The indirect effects analysis revealed that regulatory environment, economic constraints, and institutional culture influenced student outcomes not only through their effects on time-bound structures and implementation gaps, but also through complex mediated pathways that magnified their total impact. The regulatory environment's total effect on student outcomes, combining direct pathway through time-bound structures and CBE implementation gap, demonstrated how external policy frameworks exerted influence far beyond their immediate requirements, shaping institutional behavior, constraining innovation, and ultimately affecting the quality of students' educational experiences. The moderating effects of administrative support (β=-0.287, CR=-5.415, p<0.001) and faculty professional development (β=-0.234, CR=-4.875, p<0.001) provided actionable insights, suggesting that while structural factors created powerful constraints, institutional interventions could partially buffer their negative effects. Specifically, institutions with strong administrative support for flexible learning models experienced attenuated relationships between time-bound structures and implementation gaps, indicating that committed leadership could navigate regulatory constraints more creatively, negotiate exceptions, or implement workarounds that preserved some degree of flexibility despite external pressures. Similarly, comprehensive faculty professional development in competency-based pedagogy moderated the relationship between institutional culture and outcomes, suggesting that even within conservative institutional cultures resistant to change, well-prepared educators could implement CBE principles more effectively at the classroom level, creating pockets of authentic competency-based practice despite broader systemic constraints. These moderating effects, while modest in magnitude compared to the direct structural effects, offered hope that strategic institutional interventions could partially mitigate the competency paradox even before fundamental regulatory or economic reforms materialized, providing practical pathways for institutions committed to moving toward more authentic CBE implementation within existing constraint structures.

## Conclusion

This study critically examined the competency paradox—the contradiction between competency-based education's philosophical commitment to flexible, mastery-based progression and its practical implementation within rigid, time-bound educational cycles—achieving its primary objective of identifying and analyzing the multifaceted factors that perpetuated this fundamental tension. The findings revealed that institutional inertia, regulatory constraints (particularly accreditation requirements and financial aid regulations), economic pressures embedded in faculty contract structures, and stakeholder resistance to change collectively accounted for 68% of the variance in time-bound structure persistence, with institutional inertia emerging as the strongest predictor (β=0.298, p<0.001). Addressing the second objective, the study documented stark perceptual divergences among stakeholders, with administrators and policy makers rating CBE implementation authenticity significantly higher (M=3.78-3.92) than educators and students (M=2.34-2.67, F=87.45, p<0.001), indicating a critical disconnect wherein decision-makers with authority to modify structures remained least aware of ground-level contradictions undermining competency-based principles. The structural equation modeling confirmed that this implementation gap was not merely a matter of incomplete adoption but rather a systemic phenomenon driven by regulatory environments (β=0.418), institutional cultures (β=0.392), and economic constraints (β=0.337) that converged to create time-bound structures, which in turn accounted for 57% of the variance in CBE implementation gaps (β=0.756) and produced measurable negative effects on student outcomes (β=-0.523). Regarding the third objective of exploring reconciliation strategies, the study identified administrative support (β=-0.287) and faculty professional development (β=-0.234) as significant moderating factors that partially buffered the negative effects of structural constraints, suggesting that while fundamental regulatory and economic reforms remained necessary for authentic CBE implementation, strategic institutional interventions could mitigate the paradox's impact even within existing constraint structures. Ultimately, the research demonstrated that the competency paradox represented not a failure of implementation fidelity but rather a predictable outcome of attempting to operationalize transformative educational philosophy within institutional, regulatory, and economic ecosystems fundamentally structured around temporal assumptions, necessitating systemic reforms at policy, regulatory, and organizational levels to achieve the promise of genuine competency-based education that prioritizes mastery over time.

## Recommendations

**Policy and Regulatory Reform:** Educational regulatory bodies, accreditation agencies, and government departments should undertake comprehensive reviews of policies that mandate time-based structures—including credit hour requirements, minimum course duration standards, semester-based financial aid distribution, and academic calendar regulations—and develop alternative frameworks that assess institutional quality and student progress through competency attainment metrics rather than seat time,

establishing pilot programs that grant regulatory flexibility to institutions demonstrating robust competency assessment systems, creating pathways for experimentation with year-round enrollment, self-paced progression, and individualized timelines while maintaining rigorous quality assurance through outcome-based accountability measures.

**Institutional Restructuring and Capacity Building:** Educational institutions implementing competency-based curricula should invest in comprehensive organizational transformation that extends beyond curriculum redesign to encompass faculty contract renegotiation (incorporating flexible teaching loads and competency coaching roles), technological infrastructure development (implementing sophisticated learning management systems capable of tracking individualized progression and managing asynchronous cohorts), extensive professional development programs for educators in competency-based pedagogy and assessment, and systematic stakeholder engagement initiatives that address resistance to change through transparent communication about CBE benefits, phased implementation approaches that allow gradual adaptation, and creation of support structures for students navigating non-traditional progression pathways.

**Hybrid Model Development with Authentic Flexibility:** Rather than pursuing wholesale abandonment of temporal structures—which the study revealed as politically and economically unfeasible in the near term—institutions should develop sophisticated hybrid models that preserve essential structure while creating genuine flexibility within constrained timeframes, including implementing competency-based modules within semester frameworks that allow students who demonstrate early mastery to substitute advanced content or experiential learning for remaining time, establishing "flex periods" between traditional terms where students can accelerate or remediate without penalty, creating transparent competency progression maps that decouple seat time from credit accumulation, and developing consortium arrangements among institutions that allow students to access competency-based courses across organizational boundaries, thereby distributing the infrastructure costs and regulatory risks of authentic CBE implementation while expanding access to flexible learning pathways.

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