Teachers' acceptance of the flipped classroom in higher education in the Democratic Republic of Congo: A quantitative analysis of psychosocial determinants

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ABSTRACT

This study examines the psychosocial determinants of university teachers' acceptance of the flipped classroom in higher education in the Democratic Republic of Congo (DRC). A quantitative cross-sectional survey was administered to teachers participating in national pedagogical development activities. The final dataset included 876 valid responses. Acceptance of the flipped classroom was measured as an overall acceptance (intention) score, while psychosocial determinants included attitude, perceived usefulness, apprehension, and perceived institutional support. Descriptive results indicate that 52.3% of respondents reported a favorable level of acceptance. Bivariate associations between acceptance and the psychosocial determinants were weak ($|r| \leq .05$). In a multiple regression model including attitude, perceived usefulness, apprehension, and institutional support, the predictors explained a small proportion of the variance in acceptance ($R^2 = .006$; $F(4, 871) = 1.31$, $p = .264$). Findings suggest that, in this context, teachers' acceptance may be shaped less by individual psychosocial perceptions than by structural and organizational conditions that affect the feasibility and sustainability of flipped classroom implementation. Implications are discussed for institutional support, professional development, and future research in African higher education.

Keywords: Flipped classroom, teacher acceptance, technology acceptance, psychosocial determinants, higher education, Democratic Republic of Congo.

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INTRODUCTION

Over the past decade, the flipped classroom has emerged as a prominent approach for reorganizing teaching and learning by moving initial content exposure outside class time and prioritizing interactive, problem-centered learning during face-to-face sessions (Bergmann and Sams, 2012; Bishop and Verleger, 2013). Evidence syntheses suggest that flipped learning can foster engagement and learning gains, but outcomes vary substantially across disciplines, instructional designs, and implementation conditions (Qi et al., 2024). Recent higher-education case studies also report improvements in achievement, motivation, and engagement, while underscoring that effects depend on implementation quality and contextual constraints (Eltahir and Alsalhi, 2025). In higher education, adoption depends

not only on pedagogical rationale but also on the readiness of teachers and institutions to sustain the required design work, digital infrastructures, and student support.

In African higher education settings, the implementation of digitally supported pedagogies is frequently constrained by infrastructure gaps, uneven access to devices and connectivity, limited instructional design support, and heavy teaching loads. A recent review focused on African universities emphasized that professional development and enabling institutional conditions remain decisive for successful flipped classroom practices (Muhuro and Kang'ethe, 2025). These contextual conditions may weaken the explanatory power of purely psychosocial models of acceptance (e.g., attitude or perceived

usefulness) if teachers' intentions are overridden by feasibility constraints.

Despite growing interest in flipped classroom implementation, empirical studies examining teachers' acceptance and its determinants in the DRC remain scarce. Understanding acceptance is crucial for designing teacher professional development, aligning institutional support structures, and improving the scalability of the approach. Drawing on technology acceptance perspectives (Davis, 1989; Venkatesh et al., 2003) and related evidence on educators' intention to adopt flipped teaching (Jiang et al., 2022; Yahaya et al., 2022), this study investigates psychosocial determinants of university teachers' acceptance of the flipped classroom in the DRC.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Acceptance frameworks and psychosocial determinants

Technology acceptance research has emphasized perceived usefulness, perceived ease of use, and related beliefs as proximal drivers of adoption intention (Davis, 1989). Consistent with the Theory of Planned Behavior, attitudes are commonly conceptualized as antecedents of behavioral intention (Ajzen, 1991). Subsequent models (e.g., UTAUT) highlighted performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). In pedagogical innovation, "facilitating conditions" maps closely onto institutional support (e.g., infrastructure, training, and workload arrangements), while negative affect, such as apprehension or anxiety, can inhibit experimentation and sustained use (Yahaya et al., 2022).

Teacher acceptance and flipped classroom implementation

Teachers' intention to use flipped teaching has been linked to motivational and support-related factors. For example, a study of English teachers found that support and self-efficacy related beliefs were interconnected with intention to use flipped teaching (Jiang et al., 2022). Evidence from higher education contexts also indicates that teachers and students can perceive the flipped classroom positively, but implementation challenges—time demands, digital readiness, and resource constraints—often moderate acceptance (Hoshang et al., 2021; Muhuro and Kang'ethe, 2025). In addition, technological supports (e.g., intelligent tutoring systems) can scaffold pre-class learning and mitigate some implementation barriers, although such supports require local capacity and resources (Hafidi and Lamia, 2018). In teacher education contexts, transitions to online flipped formats have been associated with

perceived benefits but also reveal the importance of structured guidance and design support (Kreis, 2024).

Contextual considerations in the DRC

In the DRC, higher education institutions face heterogeneous conditions of connectivity, equipment availability, and instructional support. These conditions may shape acceptance by altering the perceived feasibility and risk of adopting flipped classroom practices. Therefore, we hypothesize that perceived institutional support will be a key determinant of acceptance, alongside attitude, perceived usefulness, and apprehension.

RESEARCH QUESTIONS AND HYPOTHESES

Research question

• RQ1: What is the level of university teachers' acceptance of the flipped classroom in the DRC?
• RQ2: How are attitude, perceived usefulness, apprehension, and perceived institutional support associated with acceptance?
• RQ3: To what extent do these psychosocial determinants predict acceptance when modeled jointly?

Hypotheses

• H1: Attitude toward the flipped classroom is positively associated with acceptance.
• H2: Perceived usefulness is positively associated with acceptance.
• H3: Apprehension is negatively associated with acceptance.
• H4: Perceived institutional support is positively associated with acceptance.

METHODOLOGY

Research design

A cross-sectional, quantitative survey design was employed to examine psychosocial determinants of teachers' acceptance of the flipped classroom.

Context and participants

Participants were university teachers engaged in national pedagogical development activities. The survey was administered during pedagogical training workshops conducted between April 2022 and May 2025. Across these workshops, 2,381 participants were registered; 876

completed questionnaires were sufficiently complete for analysis (valid response set; response rate = 36.8%).
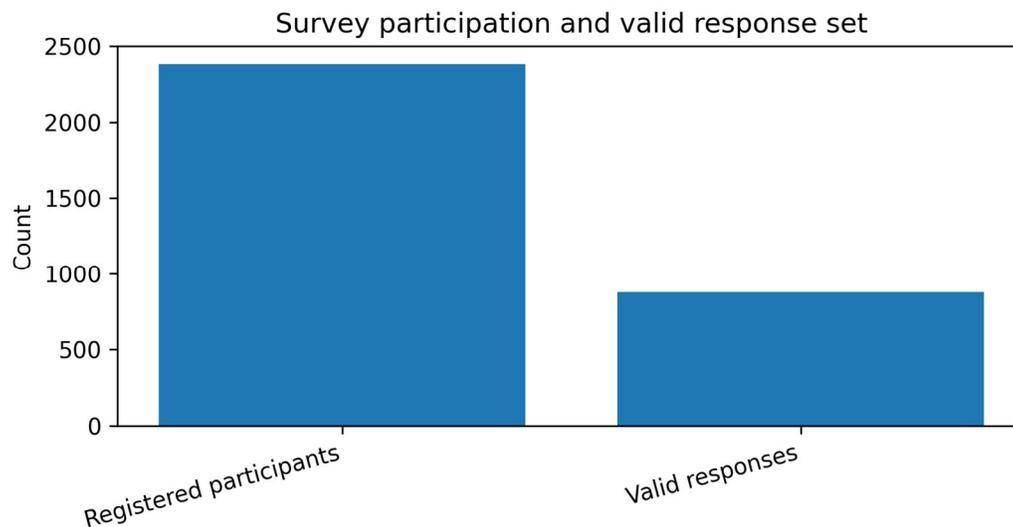

Figure 1. Survey participation and valid response set (registered participants vs. valid responses).

Data collection procedure and ethics

The questionnaire was distributed in paper and/or digital format during workshop sessions. Participation was voluntary; respondents were informed about the study objectives and the anonymous, confidential treatment of responses. No identifying personal information was collected in the analytical dataset. The study followed standard ethical practices for educational research (Creswell and Creswell, 2018).

Measures

The survey included one acceptance (intention) item as the dependent variable and four psychosocial constructs commonly used in acceptance research: attitude toward the flipped classroom, perceived usefulness, apprehension (anxiety/concerns), and perceived institutional support. Items were adapted from prior technology acceptance and flipped learning studies (Davis, 1989; Venkatesh et al., 2003; Yahaya et al., 2022). Responses were recorded on a 4-point Likert-type scale (1 = strongly disagree to 4 = strongly agree), with higher values indicating higher endorsement. Composite scores were computed by averaging the items per determinant. Acceptance was retained as a single-item score; for descriptive reporting, a favorable level of acceptance was defined as Agree/Strongly agree (score ≥ 3). Internal consistency for multi-item constructs was assessed using Cronbach's alpha; values above .70 are commonly considered acceptable for research purposes (Nunnally and Bernstein, 1994). The full survey instrument is provided in Appendix A (English item wording for transparency).

Table 1. Measures and internal consistency (Cronbach's alpha).

Construct	No. of items	Example item (short)	Cronbach's α
Attitude	3	The flipped classroom is a good approach for my teaching.	.78
Perceived usefulness	3	Flipped teaching improves students' learning outcomes.	.81
Apprehension	3	I feel concerned about implementing flipped teaching.	.74
Institutional support	3	My institution provides resources to support flipped teaching.	.76
Acceptance (intention)	1	I intend to implement flipped teaching in my courses.	n/a

Data analysis

Data were analyzed using descriptive statistics (frequencies, means, and standard deviations), Pearson correlations, and multiple linear regression. The regression model included attitude, perceived usefulness, apprehension, and institutional support as predictors and the acceptance score as the dependent variable. Statistical significance was assessed at $\alpha = .05$.

RESULTS

Descriptive results

Table 2 summarizes descriptive statistics for the acceptance score and psychosocial determinants (N = 876). Overall, 52.3% of respondents reported a favorable level of acceptance (Agree/Strongly agree on the acceptance item).

Table 2. Descriptive statistics for acceptance and determinants (N = 876)

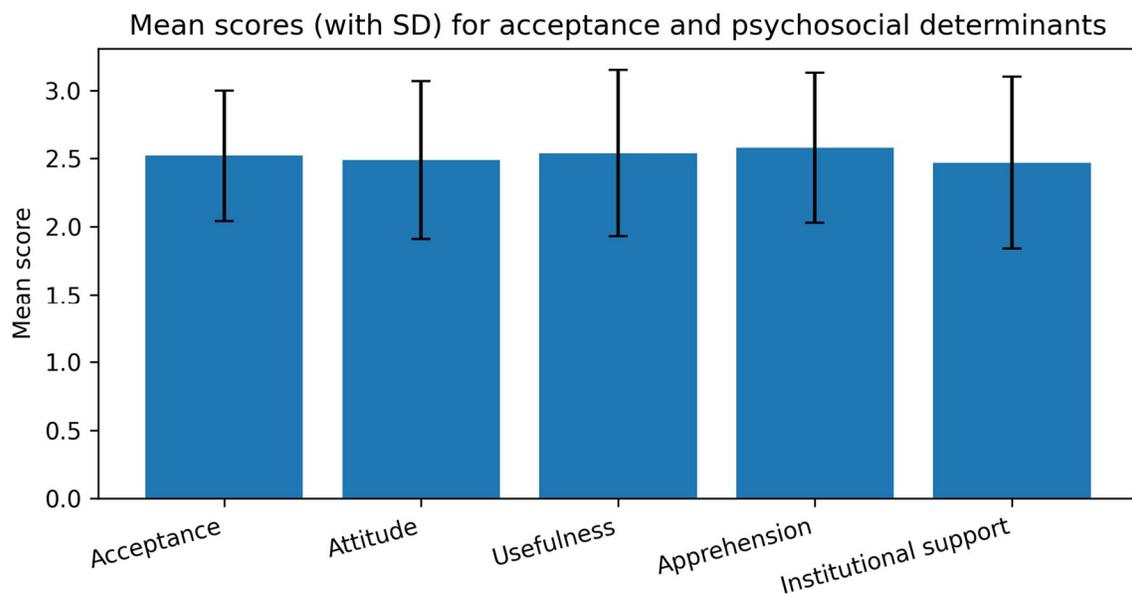| Variable	Mean	SD	Interpretation
Acceptance (score)	2.52	0.48	Moderate
Attitude	2.49	0.58	Moderate
Perceived usefulness	2.54	0.61	Moderate
Apprehension	2.58	0.55	Moderate–High
Institutional support	2.47	0.63	Moderate

Figure 2. Mean scores (with SD) for acceptance and psychosocial determinants (N = 876).

Correlations

Pearson correlations between acceptance and psychosocial determinants were weak. Acceptance was positively correlated with attitude (r = .04, p = .237) and perceived usefulness (r = .02, p = .555), and negatively correlated with apprehension (r = −.05, p = .139). The correlation with institutional support was r = .02 (p = .555).

Table 3. Correlations between acceptance and determinants (N = 876).

Pair	r	p (two-tailed)	Direction
Acceptance × Attitude	.04	.237	Positive
Acceptance × Usefulness	.02	.555	Positive
Acceptance × Apprehension	−.05	.139	Negative
Acceptance × Institutional support	.02	.555	Positive

Multiple regression

A multiple regression model was estimated with acceptance as the dependent variable and the four determinants as predictors. The model was not statistically significant ($F_{(4, 871)} = 1.31$, $p = .264$) and explained a small proportion of variance ($R^2 = .006$; adjusted $R^2 = .001$). None of the predictors reached statistical significance in the joint model ($p > .05$).

Table 4. Multiple regression predicting acceptance (N = 876).

Predictor	Standardized β	Direction (expected)
Attitude	.024	Positive
Perceived usefulness	−.014	Positive
Apprehension	−.034	Negative
Institutional support	.007	Positive

DISCUSSION

This study examined university teachers' acceptance of the flipped classroom in the DRC and tested psychosocial determinants derived from acceptance frameworks. Although more than half of the sample reported a favorable level of acceptance (52.3%), the relationships between acceptance and attitude, perceived usefulness, apprehension, and perceived institutional support were weak. The regression model explained only 0.6% of the variance in acceptance and was not statistically significant.

These findings suggest that, in this context, individual perceptions may not be sufficient to account for acceptance. In resource-constrained environments, structural and organizational conditions (e.g., internet access, availability of devices, class size, workload, and institutional instructional design capacity) can constrain implementation regardless of teachers' attitudes. This interpretation is consistent with work highlighting that facilitating conditions, professional development, and institutional arrangements are central to flipping feasibility in African universities (Muhuro and Kang'ethe, 2025). It is also coherent with evidence that teachers' intention to use flipped teaching is intertwined with support-related factors and perceived capacity to implement the approach (Jiang et al., 2022; Yahaya et al., 2022).

Another explanation is measurement and model specification. Acceptance may be multidimensional and context-dependent; psychosocial determinants might interact with contextual constraints such that their effects are observable only under minimal enabling conditions. Future research should therefore integrate institutional and infrastructural indicators (e.g., access to learning management systems, training exposure, availability of digital content, and workload protection), and examine moderation effects. Mixed-method designs could further clarify how teachers interpret 'usefulness' and 'support' under local constraints and how these interpretations shape practical adoption decisions.

Although evidence syntheses and recent case studies often report positive learning-related outcomes of flipped classroom approaches (Qi et al., 2024; Eltahir and Alsalhi, 2025), the present results indicate that acceptance in the DRC is only weakly associated with common psychosocial determinants. This contrast suggests that perceived pedagogical benefits may not translate into adoption readiness when implementation requires resources, time, and institutional coordination that are uncertain or unavailable.

From an implementation perspective, the finding aligns with the centrality of facilitating conditions in UTAUT (Venkatesh et al., 2003) and with African-university evidence emphasizing infrastructure, professional development, and institutional arrangements as prerequisites for sustained flipped teaching (Muhuro and Kang'ethe, 2025). In related work, educators' intention to adopt flipped teaching has been linked to support- and capacity-related beliefs (Jiang et al., 2022; Yahaya et al., 2022), which may be shaped by workload and instructional design support. Therefore, future models in the DRC should integrate objective institutional indicators (connectivity, access to learning platforms, workload protection, and availability of digital content support) and test whether psychosocial variables operate as moderators rather than direct predictors.

IMPLICATIONS FOR PRACTICE AND POLICY

First, higher education institutions seeking to scale flipped classroom practices should prioritize enabling conditions: reliable connectivity, access to devices and platforms, and instructional design support. Second, professional development should combine pedagogical rationale with practical design assistance (e.g., micro-design of pre-class materials, active learning facilitation, and assessment alignment), supported by mentoring communities. Third, institutional policy should address workload and

recognition mechanisms to reduce the opportunity cost of redesigning courses, which may be particularly salient in contexts where the psychosocial determinants alone do not strongly predict acceptance.

LIMITATIONS AND FUTURE RESEARCH

The study is limited by its cross-sectional design and reliance on self-reported measures, which preclude causal inference. The sample was drawn from teachers participating in pedagogical training workshops and may not represent all university teachers nationally. Future work should employ longitudinal designs to track changes in acceptance after training and implementation support, include objective indicators of adoption (e.g., course redesign artifacts, platform analytics), and examine contextual moderators and institutional variables.

CONCLUSION

Using survey data from 876 university teachers in the DRC, this study found moderate levels of flipped classroom acceptance but weak associations between acceptance and common psychosocial determinants (attitude, perceived usefulness, apprehension, and institutional support). The results indicate that scalable adoption may depend more on structural and organizational enabling conditions than on psychosocial perceptions alone. Policy and practice should therefore address facilitating conditions and sustained support mechanisms to enable effective flipped classroom implementation in the DRC's higher education institutions.

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Appendix A. Survey questionnaire (item statements)

This appendix reports the item statements used to operationalize the four psychosocial constructs in the questionnaire. Items were presented on a Likert-type agreement scale with higher values indicating stronger endorsement.
A0. Acceptance (intention) (1 item)
• I intend to implement flipped teaching in my courses (within the next academic year).

A1. Attitude toward the flipped classroom (3 items)

• The flipped classroom is a good approach for my teaching.
• I like the idea of implementing the flipped classroom in my courses.
• Adopting the flipped classroom would be beneficial for my teaching practice.

A2. Perceived usefulness (3 items)

• Flipped teaching can improve students' learning outcomes.
• Flipped teaching can increase students' engagement during face-to-face sessions.
• Flipped teaching can improve my overall teaching effectiveness.

A3. Apprehension (anxiety/concerns) (3 items)

• I feel concerned about implementing flipped teaching in my courses.
• I am worried about the time required to prepare flipped classroom materials.
• I feel anxious about the digital tools required for flipped teaching.

A4. Perceived institutional support (3 items)

• My institution provides resources (e.g., connectivity, platforms, equipment) to support flipped teaching.
• My institution offers training or mentoring to help teachers implement flipped teaching.
• My institution encourages and recognizes pedagogical innovations such as flipped teaching.