Pedagogical Engineering of Flipped Classrooms in Moroccan Higher Education: Analysis of Student Perceptions in a Language Course at the Faculty of Letters and Human Sciences of Oujda

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Abstract

This study examines student perceptions of flipped classroom implementation in a language course at the Faculty of Letters and Human Sciences of Oujda, Morocco, focusing on the pedagogical engineering aspects within a hybrid learning system. The research employed a mixed-methods approach, utilizing a comprehensive questionnaire based on five theoretical dimensions: presence/distance articulation, mediatization, mediation, accompaniment, and openness. Data were collected from 67 students across three distinct hybrid training programs, representing a 65% response rate.

Results demonstrate strong positive perceptions of flipped classroom methodology, with 89.5% of participants reporting enhanced active learning across both face-to-face and distance learning modalities. The study reveals distinct patterns in competency development, with face-to-face sessions primarily enhancing relational and communicative skills, while distance components strengthened organizational and self-directed learning capabilities. Analysis of support mechanisms showed high satisfaction with metacognitive guidance (86.5%) and peer support systems (74.6% - 88%), though areas for improvement were identified in methodological support and resource provision.

The findings validate the research hypotheses regarding effective learner participation and the importance of learning support mechanisms, while highlighting specific areas requiring enhancement. Particularly significant is the strong preference (85%) for flipped classroom methodology over traditional approaches, with students emphasizing benefits in active learning, autonomy development, and constructive learning experiences. These results have important implications for flipped classroom implementation in Moroccan higher education and similar developing contexts, suggesting the need for systematic integration of support mechanisms and careful attention to technological infrastructure development.

Keywords: flipped classroom, higher education, pedagogical engineering, hybrid learning, active learning, educational technology

Introduction

The transformation of higher education practices has accelerated significantly in recent decades, driven by multiple converging factors including massification of access, democratization of knowledge, and the emergence of digital learning cultures (Velegol et al., 2015). Within the Moroccan context, this evolution has particular significance as universities strive to modernize their pedagogical approaches while addressing challenges of increasing enrollment and maintaining educational quality (Ministry of Higher Education and Scientific Research, 2019). This paradigm shift has catalyzed a movement away from traditional

instructor-centered pedagogies toward innovative approaches that position learners at the center of the educational process.

The flipped classroom model has emerged as a particularly promising pedagogical innovation, representing a distinctive architecture that inverts the traditional relationship between class time and independent study. In this model, direct instruction moves from the group learning space to the individual learning space, while the classroom becomes an interactive environment where instructors guide students in applying concepts through active learning strategies (Bishop & Verleger, 2013). This transformation responds to mounting evidence that passive reception of information yields suboptimal learning outcomes compared to active engagement with content (Bloom et al., 1956).

Within Morocco's higher education landscape, the implementation of flipped classrooms aligns with the national strategy for educational reform, which emphasizes the integration of digital technologies and innovative pedagogical approaches (Higher Education Development Strategy 2015-2030). However, the effectiveness of such implementations depends heavily on student engagement and capacity for self-directed learning. As Deschryver and Lebrun (2014, p. 80) note, "even if the device is designed by the teacher to support learning, the student may not perceive it as such." This observation underscores the critical importance of understanding learner perceptions and experiences with flipped classroom implementation.

The present study examines student perceptions of flipped classroom pedagogy at the Faculty of Letters and Human Sciences of Oujda, Morocco, guided by two primary hypotheses:

H1: According to students, the pedagogical engineering of the flipped classroom effectively accounts for learner participation.

H2: Students identify the reinforcement of learning support mechanisms as one of the most crucial measures for improving flipped classroom implementation.

Using a theoretical framework that encompasses five key dimensions - presence/distance articulation, mediatization, mediation, accompaniment, and openness (Deschryver et al., 2011) - this research addresses two primary questions:

1. How do learners perceive the pedagogical engineering of flipped classrooms within a hybrid learning system?
2. What conditions do students identify as necessary for improving flipped classroom implementation?

The study's significance lies in its potential to inform evidence-based enhancement of flipped classroom design and implementation in higher education contexts. By examining student perspectives through a comprehensive theoretical lens, this research contributes to the growing body of knowledge on effective active learning strategies in university settings.

Methodology:

Research Design and Theoretical Framework

This study employed a mixed-methods research design within an exploratory framework, following a hypothetico-deductive approach. This methodological choice was informed by the complex nature of educational phenomena and the need to capture both quantitative patterns and qualitative insights into student perceptions (Entwistle, 2003; Ramsden, 2003). The research design allowed for the examination of both objective variables (quantifiable aspects of flipped classroom implementation) and subjective variables (student perceptions and experiences), which Romainville (1993) identifies as crucial for understanding the effects of educational interventions on student learning.

Theoretical Foundation

The theoretical foundation was built upon the hybrid learning dispositif model developed by Deschryver et al. (2011), later refined by Burton et al. (2011) and Peraya and Peltier (2012). This comprehensive framework identifies five fundamental dimensions for analyzing blended learning environments, each comprising specific components that facilitate systematic analysis of hybrid learning situations.

- Presence/Distance Articulation

The presence/distance articulation dimension examines the dynamic interaction between face-to-face and distance learning components. As noted by Charlier et al. (2006), this dimension focuses on understanding how students engage actively in physical classroom settings while maintaining meaningful participation in distance learning activities. According to Paquette (2002), successful articulation between these modalities is crucial for effective hybrid learning environments. The framework considers the integration mechanisms that bridge these two modalities, analyzing how different competencies develop in each context. Peraya and Deschryver (2002-2005) emphasize that particular attention must be paid to the ways in which face-to-face interactions complement distance learning activities, creating a cohesive learning experience that maximizes the benefits of both approaches.

- Mediatization

According to Charlier et al. (2006), mediatization extends beyond simple technical mediation to include the entire process of designing and implementing communication and training devices. This dimension encompasses five interconnected components that support the learning process. The first component addresses learning support tools, including comprehensive systems for tutoring and accompaniment, dedicated workspaces for learning activities, and mechanisms that promote self-reflection among students. These tools are designed to facilitate both independent and guided learning experiences.

The second component focuses on management and communication tools, incorporating platforms that enable effective communication between all participants in the learning process. These systems include collaborative spaces where students can work together, organizational tools for managing learning activities, and mechanisms for efficient information exchange among participants.

Multimedia resources constitute the third component, emphasizing the importance of diverse content formats that cater to different learning styles and preferences. This includes carefully curated educational materials that can be easily accessed and adapted to meet varying student needs and learning objectives.

The fourth component addresses multimedia work requirements, focusing on how students engage with and create digital content. This encompasses the development of student-generated multimedia materials, interactive assignment formats, and sophisticated digital submission systems that facilitate comprehensive evaluation of student work.

The final component concentrates on synchronous communication tools, which enable real-time collaboration and immediate interaction among participants. These tools facilitate instantaneous feedback, virtual meetings, and dynamic group discussions, ensuring that distance learning maintains the immediacy and engagement of face-to-face instruction.

- Mediation

The mediation dimension encompasses two fundamental aspects of the learning process, Deschryver et al. (2011) identify document interaction and reflective-relational objectives as key components.

The document interaction component explores how learners engage with educational materials through advanced annotation and commentary functions. These capabilities extend beyond simple reading to include sophisticated forms of content manipulation, allowing students to actively engage with learning materials through digital markup, collaborative editing, and dynamic resource modification. This interactive approach transforms static educational content into dynamic learning tools that support deep engagement with course materials.

The reflective-relational component addresses the development of higher-order thinking skills and interpersonal capabilities. This aspect focuses on fostering critical thinking through structured reflection activities that encourage students to question assumptions and evaluate their learning processes. Additionally, it emphasizes the building of meaningful connections within the learning community, promoting the development of strong interpersonal relationships that support collaborative learning and knowledge construction. This dual focus on individual reflection and community building creates a rich learning environment that supports both personal growth and social learning.

- Accompaniment

The accompaniment dimension, as defined by Deschryver et al. (2011), distinguishes three essential forms of support that facilitate student success in hybrid learning environments:

Methodological support represents the first form, providing structured guidance in task organization and work planning. This support helps students develop effective learning strategies and manage complex educational processes, ensuring they can navigate the demands of both face-to-face and distance learning components efficiently.

Metacognitive guidance, the second form of accompaniment, focuses on developing students' awareness of their learning processes. This involves implementing sophisticated self-assessment tools and progress monitoring mechanisms that enable learners to evaluate their understanding and adjust their learning strategies accordingly. Through careful attention to metacognitive development, students become more autonomous and effective learners, capable of managing their educational journey with increasing independence.

Peer support constitutes the third form of accompaniment, establishing structured systems for collaborative learning and mutual assistance. This component recognizes the value of peer-to-peer learning interactions, implementing formal peer tutoring systems and facilitating

productive group work. These peer support mechanisms create a supportive learning community where students can benefit from shared knowledge and experiences while developing important collaborative skills.

- Openness

The openness dimension, according to Jézégou (2008), examines two crucial aspects of flexible learning design: pedagogical method flexibility and external resource integration. The pedagogical flexibility component addresses the importance of accommodating diverse learning approaches and individual student needs. This flexibility allows for the adaptation of teaching methods to match different learning styles and preferences, ensuring that each student can follow a learning path that aligns with their individual characteristics and goals.

External resource integration expands the learning environment beyond traditional academic boundaries. This component focuses on incorporating diverse external resources and expertise into the learning process, creating connections between academic content and real-world applications. Through careful integration of external resources and community engagement opportunities, students develop a broader understanding of course concepts and their practical applications.

The theoretical framework's comprehensive nature provides a structured approach to analyzing student perceptions while acknowledging the complex interplay between technological, pedagogical, and social elements in flipped classroom implementation. This framework was operationalized through carefully designed survey instruments that captured both quantitative metrics and qualitative insights, allowing for systematic examination of student perceptions across all five dimensions.

Research Context and Participants

The study was conducted at the Faculty of Letters and Human Sciences of Oujda, Morocco, targeting three distinct hybrid training programs that had implemented flipped classroom methodologies in a language course. From a distributed population of 103 questionnaires, 67 valid responses were received (65% response rate), with the following distribution:

- Master's in Training Engineering, Educational Technology, and Communication (IFTEC): 43% (n=29)
- Master's in Training Engineering and Educational Technology (IFTE): 36% (n=24)

- Education License (French language teaching specialty): 21% (n=14)

Data Collection Instrument

The study employed a comprehensive questionnaire designed to capture the multifaceted nature of student perceptions regarding flipped classroom implementation. This instrument was systematically developed to align with the five theoretical dimensions while ensuring thorough coverage of all 14 components identified in the research framework.

At its foundation, the questionnaire incorporated three complementary response formats to ensure comprehensive data collection. First, a five-point Likert scale (ranging from strongly disagree to strongly agree) formed the backbone of the quantitative assessment, enabling precise measurement of student attitudes and perceptions. Additionally, semi-structured questions provided opportunities for more nuanced responses, while open-ended questions allowed participants to express detailed perspectives that might not be captured through structured responses alone.

The questionnaire's content was carefully structured around the five theoretical dimensions, with specific sections dedicated to each component:

In examining presence/distance articulation, the instrument focused on two key aspects: active participation in face-to-face sessions and engagement in distance learning activities. Questions in this section explored how students perceived their involvement in both learning contexts, particularly investigating the development of different competencies across these modalities.

The mediatization dimension was addressed through a comprehensive set of items examining five distinct aspects. Initially, questions focused on learning support tools, investigating their availability, relevance, and sufficiency. Subsequently, the instrument explored communication and interaction tools, assessing their contribution to the learning process. The questionnaire then examined multimedia resources, investigating their diversity and effectiveness. Following this, items addressed multimedia work requirements and their impact on student motivation. Finally, questions evaluated the use and effectiveness of synchronous communication tools in facilitating collaborative work.

Regarding mediation, the instrument incorporated items examining both document interaction capabilities and the achievement of reflective-relational objectives. These questions specifically explored students' ability to engage with course materials through annotation and

commentary, while also investigating the development of critical thinking and interpersonal relationships.

The accompaniment dimension was investigated through carefully crafted questions addressing three forms of support. First, items examined methodological support from instructors, followed by questions about metacognitive guidance. The final section in this dimension explored peer support mechanisms, investigating both the giving and receiving of assistance among students.

For the openness dimension, the questionnaire examined both pedagogical flexibility and access to external resources. Questions in this section investigated students' ability to choose appropriate learning methods and their access to diverse educational resources beyond the traditional academic context.

Beyond the core dimensional assessment, the questionnaire included a comparative section where students were asked to evaluate their preferences between flipped and traditional classroom approaches. This section was complemented by open-ended questions soliciting detailed justifications for these preferences and suggestions for improvement.

Data Analysis

Quantitative data analysis was conducted using Excel, generating descriptive statistics and visual representations of response patterns. Qualitative responses were subjected to thematic analysis, identifying recurring patterns and emergent themes related to the research questions. The analysis focused on both the verification of research hypotheses and the exploration of unanticipated insights emerging from student responses.

Results

The findings of this study are organized according to the five theoretical dimensions of the research framework, followed by a comparative analysis between flipped and traditional classroom preferences. Each dimension reveals distinct patterns in student perceptions and experiences with flipped classroom implementation.

- Active Learning and Presence/Distance Articulation

Analysis of student responses revealed a strong positive perception regarding the flipped classroom's impact on learning engagement. Notably, 89.5% of participants reported that the

model enhanced active learning in both face-to-face and distance learning contexts (see Figure 1).

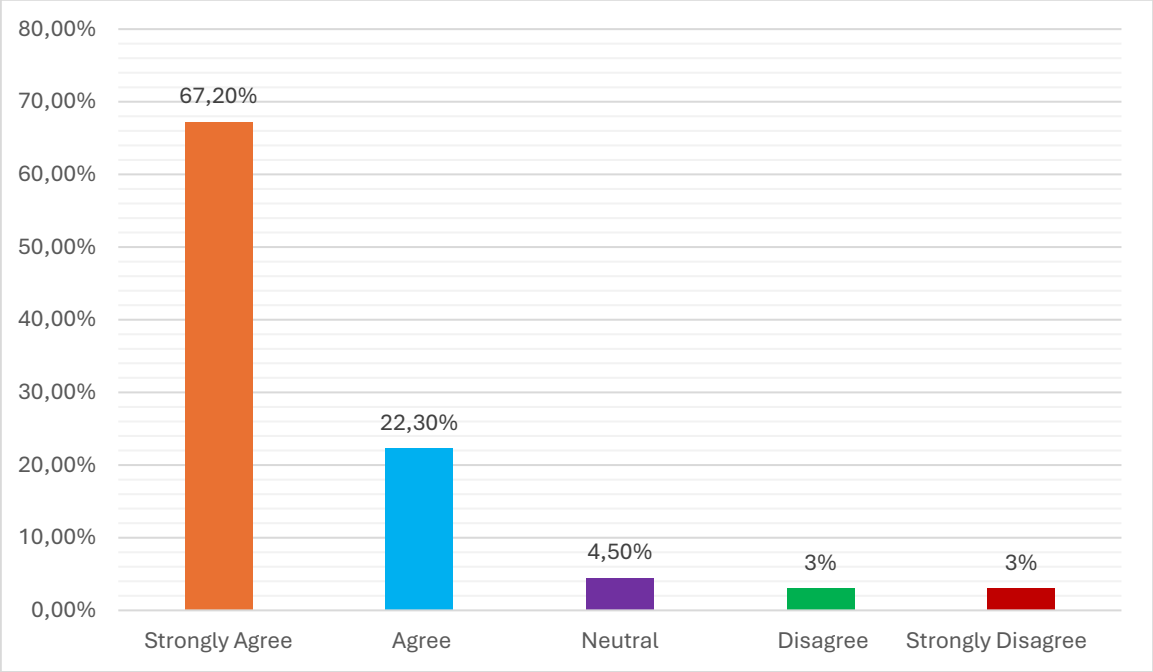

Figure 1: Flipped classroom's impact on enhancing learning engagement

- Perceived Impact on Active Learning

The development of competencies showed distinct patterns across learning modalities. Face-to-face sessions predominantly facilitated the development of three key competency areas:

- Relational competencies
- Reflective abilities
- Communication skills

Conversely, distance learning sessions enhanced a different but complementary set of skills:

- Organizational competencies
- Reflective capabilities
- Self-directed learning skills

The articulation between face-to-face and distance components emerged as particularly effective, with 91% of participants identifying strong integration between these modalities.

Only 1.6% expressed disagreement with this assessment, while 7.4% maintained a neutral position (see Figure 2).

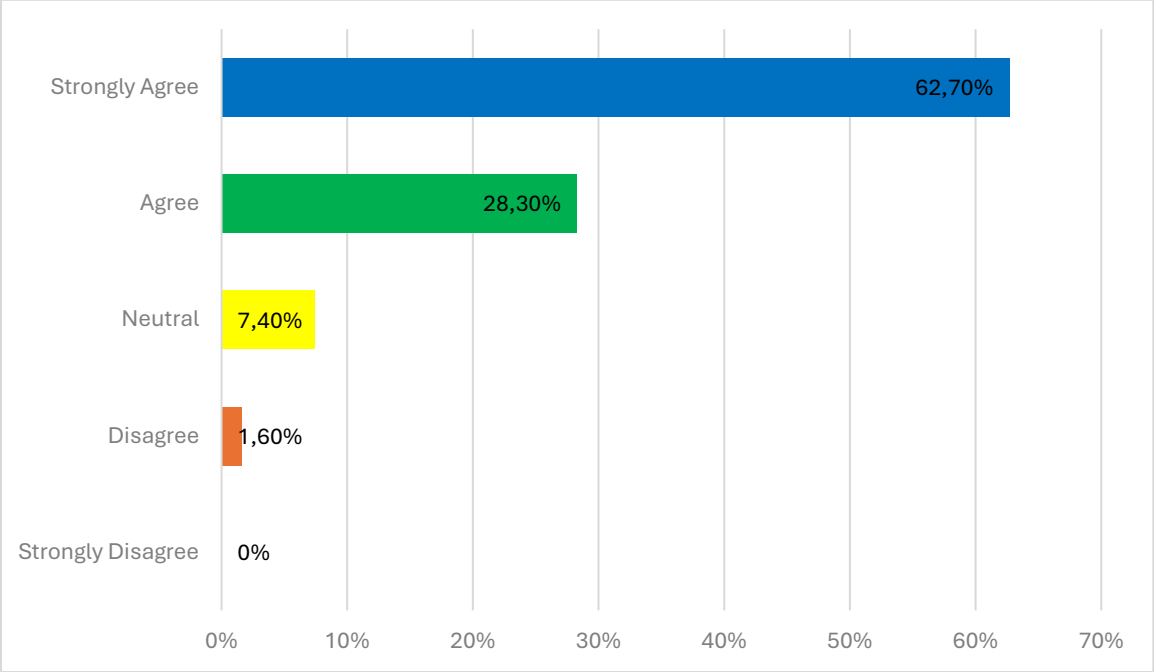

Figure 2:Perceived effectiveness of Articulation Between Face-to-Face and Distance Learning Modalities

- Mediatization and Tool Implementation

The analysis of mediatization revealed complex patterns in tool utilization and perceived effectiveness across multiple dimensions. Results demonstrate a significant positive response to learning support tools, with 64% of participants reporting increased availability of support mechanisms in the flipped classroom format (see Table 1).

Aspect	Positive Response	Neutral	Negative Response
Tool Relevance	73%	14%	13%
Tool Sufficiency	47.4%	16.8%	35.8%
Contribution to Learning	68.6%	23.8%	7.6%

Table 1: Perceptions of Learning Support Tools

Resource diversity emerged as a crucial aspect of the flipped classroom experience. Analysis of multimedia resource utilization revealed a clear preference hierarchy, with video content emerging as the predominant format (see Table 2).

Resource Type	Frequency
Video content	67.2%

Visual aids	13.4%
PowerPoint presentations	10.4%
PDF documents	4.5%
Learning platforms	3.0%
Others	10.4%

Table 2: Multimedia Resource Preferences

Note: The percentages are calculated based on the frequency of mentions by the respondents. Some students mentioned multiple resource types, which explains why the total percentage exceeds 100%.

Student engagement with multimedia assignments showed particularly strong positive outcomes, with 88% of participants reporting increased motivation when working with multimedia materials compared to traditional assignments. This heightened engagement was supported by robust communication and collaboration infrastructure, as evidenced by 82% of participants reporting that synchronous communication tools effectively facilitated collaborative work (see Figure 3).

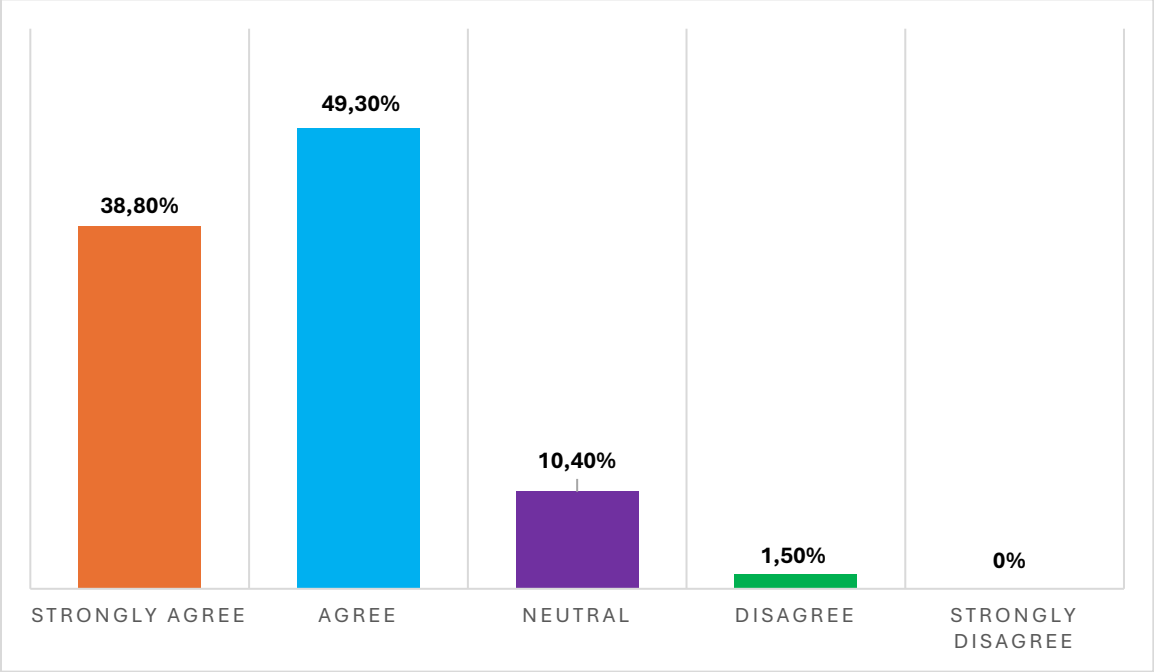

Figure 3: Facilitation of collaborative work

- Mediation and Learning Processes

The mediation dimension revealed significant impacts on student engagement and interaction patterns. Document interaction capabilities showed notable improvement, with 61.1% of participants reporting enhanced ability to annotate and comment on course materials.

However, this aspect also revealed room for improvement, with 23.8% maintaining neutral positions and 15.1% indicating dissatisfaction with annotation capabilities.

Particularly noteworthy were the findings regarding reflective and relational outcomes:

Aspect	Positive Response
Self-reflection capabilities	83.5%
Enhanced peer relationships	83.5%
Improved instructor interaction	71.6%

Table 3: Reflective and Relational Outcomes

The data revealed a strong correlation between mediation tools and the development of higher-order thinking skills. Students reported significant improvements in their ability to:

- Critically evaluate course content (86.5%)
- Engage in meaningful peer discussions (74.6%)
- Apply concepts across different contexts (89.5%)

The integration of communication tools played a crucial role in facilitating these outcomes, with 88% of participants reporting that they were able to provide more effective peer support within the flipped classroom environment. This high level of peer engagement was complemented by strong instructor support, creating a comprehensive support network for student learning.

- Accompaniment and Support Structures

The analysis of support mechanisms revealed nuanced patterns across different forms of accompaniment. Instructor support emerged as a critical component, with distinct patterns in both methodological and metacognitive guidance (see Figure 4).

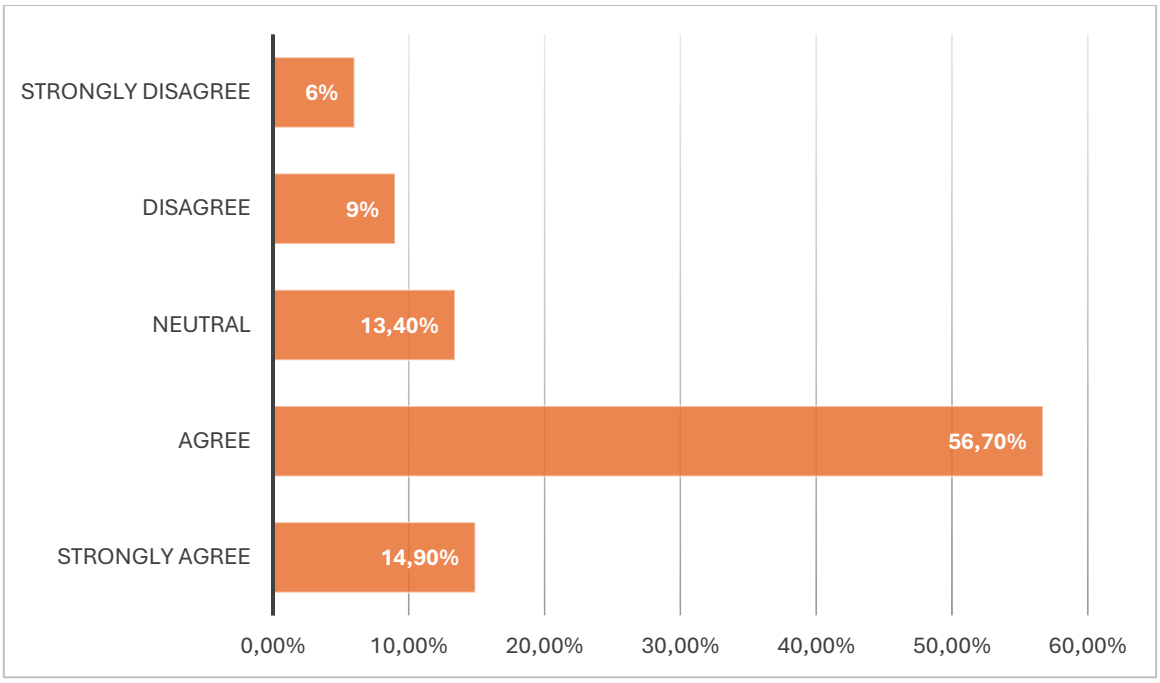

Figure 4: Methodological Support from Instructors

Metacognitive guidance showed even stronger positive outcomes, with 86.5% of participants reporting improved support for learning reflection and strategy development. This high level of satisfaction was distributed across multiple aspects of metacognitive support (see Table 3).

Aspect	Positive Response
Learning strategy development	86.5%
Self-assessment guidance	83.5%
Progress monitoring support	74.6%
Strategy evaluation assistance	71.6%

Table 4: Distribution of Metacognitive Support Satisfaction

Peer support mechanisms demonstrated particularly robust outcomes, with bidirectional benefits evident in the data:

- 74.6% reported receiving increased peer assistance
- 88% indicated providing more help to peers
- Only 6% expressed dissatisfaction with peer support structures
- 19.4% maintained neutral positions regarding peer support receipt

- Openness and Pedagogical Flexibility

The openness dimension revealed strong positive perceptions across both pedagogical flexibility and resource accessibility. An overwhelming majority (89.5%) valued the ability to choose appropriate pedagogical methods, with similar numbers reporting increased access to external resources and actors. The distribution of responses regarding pedagogical flexibility is particularly noteworthy (see Figure 5).

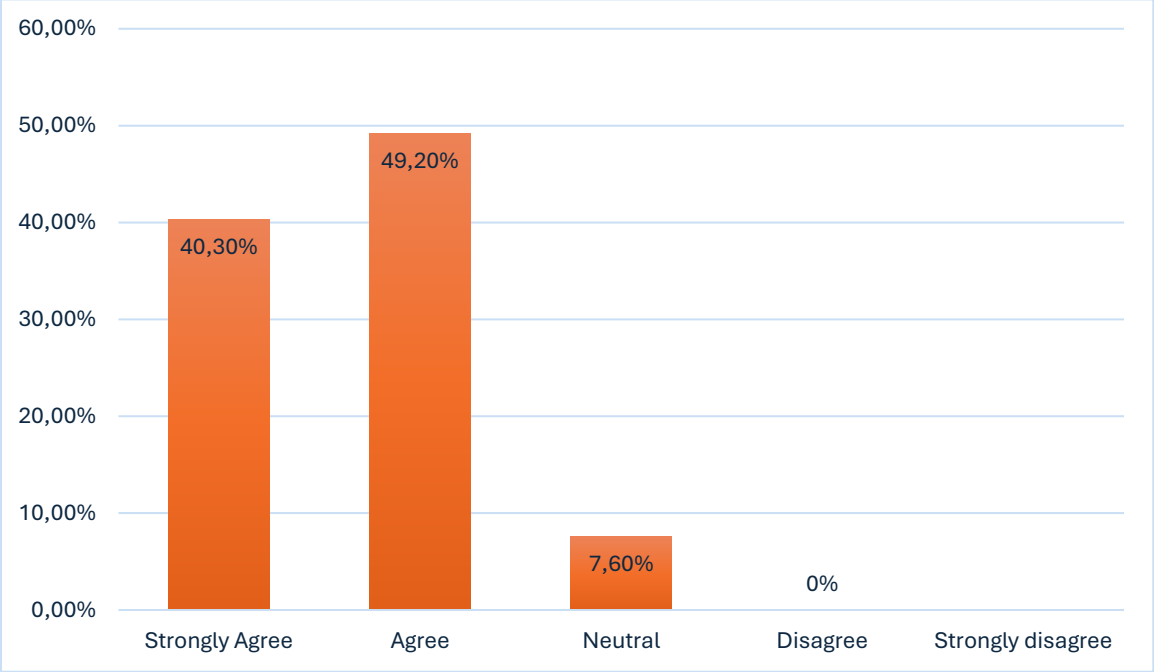

Figure 5: Pedagogical Method Flexibility

- Comparative Analysis: Flipped vs Traditional Classroom

When asked to compare flipped and traditional classroom approaches, students showed a strong preference for the flipped model (see Figure 6).

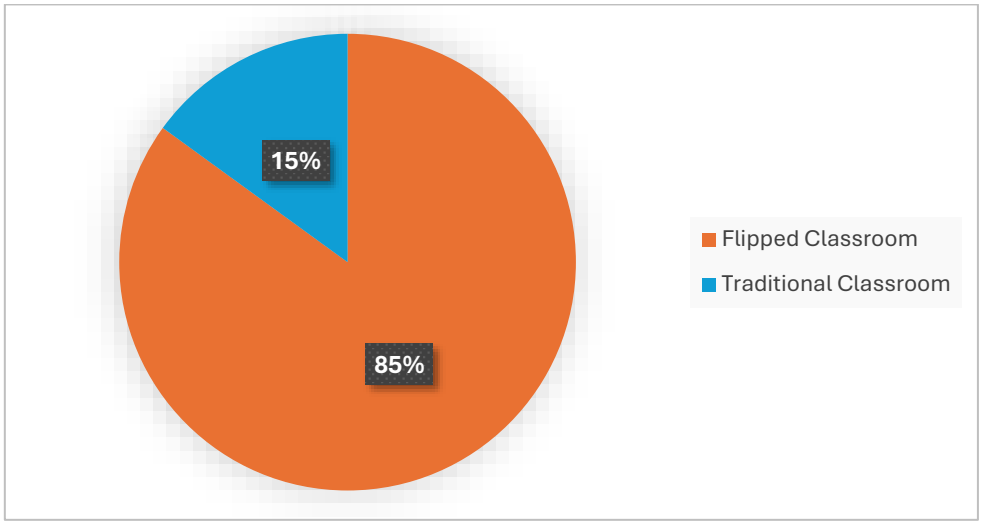

Figure 6: Classroom Preference

Students justified their preferences through various arguments, summarized in Table 4:

Preference	Arguments	Frequency
Flipped Classroom	Active learning	12
	Autonomy development	7
	Rich/constructive learning	7
	Engaging experience	6
	Multiple competency development	6
	Reflective skill enhancement	5
	Social skill development	5
	Interactive nature	5
Traditional Classroom	Ease of implementation	6
	Better Guidance	2
	More serious approach	1
	Better skill development	1

Table 5: Justifications for Classroom Preference

This comprehensive analysis of results demonstrates strong student preference for the flipped classroom model while highlighting specific areas where implementation might be enhanced. The data suggests that while the flipped classroom model effectively supports active learning and skill development, continued attention to support structures and resource provision could further improve its effectiveness.

Discussion

This study's findings provide significant insights into student perceptions of flipped classroom implementation in higher education, revealing both the strengths and areas for improvement in this pedagogical model. The discussion examines these findings through the lens of our theoretical framework, considering implications for pedagogical practice in the Moroccan higher education context.

- Active Learning and Hybrid Integration

The high percentage (89.5%) of students reporting enhanced active learning aligns with Freeman et al.'s (2014) meta-analysis findings, which demonstrated significant improvements in student performance when active learning strategies are employed. However, our study

extends this understanding by revealing distinct patterns in competency development across learning modalities. The differentiated development of skills between face-to-face sessions (focusing on relational, reflective, and communicational competencies) and distance learning components (enhancing organizational and self-directed learning skills) suggests that the flipped classroom creates complementary learning spaces, each fostering specific competencies.

This complementarity supports Hannafin et al.'s (1997) argument for learner-centered environments that engage students in higher-order tasks. Furthermore, the strong articulation between presence and distance components (91% positive response) demonstrates successful implementation of what Charlier et al. (2006) term the "hybrid characteristics," where technology integration enhances rather than fragments the learning process.

- Mediatization and Resource Implementation

The findings regarding mediatization reveal a complex picture of tool utilization and effectiveness. While 73% of participants found learning support tools relevant, the significant percentage (35.8%) indicating insufficiency suggests a gap between tool availability and student needs. This tension reflects Paquette's (2002) observation that effective instructional engineering requires careful alignment between technological tools and pedagogical objectives.

The predominance of video content as the preferred resource format (45 mentions) aligns with Bishop and Verleger's (2013) technological movement theory, suggesting that digital video has become a central medium in flipped classroom implementation. However, the diversity of other resource types indicates recognition of what Means (1994) describes as the need for multiple representation formats to support different learning styles.

- Mediation and Learning Processes

The study's findings regarding mediation processes reveal significant insights into how students engage with learning materials and develop higher-order thinking skills. The high percentage of students reporting improved self-reflection capabilities (83.5%) supports Vygotsky's socio-constructivist theory and aligns with what Bruner (2008) terms "scaffolded learning environments." These results are particularly significant in the Moroccan higher education context, where traditional teaching methods have historically emphasized knowledge transmission over reflective practice.

Document interaction and annotation capabilities emerged as an area with mixed results. While 61.1% reported enhanced ability to annotate and comment on materials, this relatively modest percentage suggests room for improvement in supporting what Deschryver and Lebrun (2014) term "active document engagement." This finding is particularly relevant given the growing emphasis on digital literacy in Moroccan higher education institutions, suggesting a need for enhanced digital tool integration and training.

The strong improvement in relational outcomes (83.5% reporting enhanced peer relationships) demonstrates the development of what Johnson and Johnson (1994) describe as positive interdependence in learning communities. This social dimension of learning appears to be particularly well-supported by the flipped classroom model, fostering what Alzain (2015) identifies as critical elements of effective learning: the ability to link learning to personal experiences and behavioral development.

- Accompaniment and Support Structures

The analysis of accompaniment structures reveals a sophisticated interplay between different forms of support. The strong positive perceptions of both methodological (71.6%) and metacognitive (86.5%) support suggest successful implementation of what Jézégou (2008) terms "structured autonomy." These findings align with Alshahry's (2015) research on flipped classroom implementation, which emphasizes the importance of comprehensive support structures in successful flipped learning environments.

However, the 15% disagreeing with improved methodological support indicates potential inconsistencies in support provision. This finding resonates with Tully's (2014) observation that flipped classroom success depends heavily on instructor engagement and support quality. In the context of Moroccan higher education, where flipped classroom methodology represents a significant departure from traditional teaching approaches, this suggests a need for more standardized support mechanisms and enhanced instructor training.

Peer support emerged as a particularly robust element, with 74.6% reporting receiving increased peer assistance and 88% indicating they provided more help to peers. These findings support what Wolford et al. (2001) describe as effective peer learning communities. The bidirectional nature of peer support - both giving and receiving - suggests the development of what Dickenson (2016) terms "active practices that enable learners to connect learning with life experiences." This aspect appears particularly valuable in the Moroccan context, where collaborative learning traditions can be leveraged to enhance educational outcomes.

- Openness and Pedagogical Flexibility

The findings regarding openness and pedagogical flexibility reveal significant implications for flipped classroom implementation. The overwhelming preference for pedagogical flexibility (89.5%) aligns with what Burton et al. (2011) identify as crucial elements of successful hybrid learning environments. This high level of satisfaction with methodological choice supports Peraya and Peltier's (2012) assertion that learner autonomy in pedagogical approach selection significantly enhances engagement and learning outcomes.

The equally strong positive response (89.5%) regarding access to external resources and actors demonstrates what Charlier et al. (2006) describe as successful "opening of the pedagogical space." This opening is particularly significant in the Moroccan higher education context, where access to diverse educational resources has historically been more limited.

- Comparative Analysis and Model Preference

The strong preference for the flipped classroom model (85% versus 15% for traditional approaches) provides compelling evidence for the effectiveness of this pedagogical approach. The justifications offered by students align with key theoretical principles of active learning and student-centered pedagogy. Particularly noteworthy are the frequent citations of active learning (12 mentions), autonomy development (7 mentions), and rich/constructive learning experiences (7 mentions) as advantages of the flipped approach.

Hypothesis Verification

H1: According to students, the pedagogical engineering of the flipped classroom effectively accounts for learner participation.

This hypothesis is strongly supported by the empirical evidence across all five dimensions of the theoretical framework. The data reveals high levels of active participation in both face-to-face and distance components, with 89.5% of students reporting enhanced engagement in both modalities. Additionally, students demonstrated strong perceived effectiveness of learning support tools, with 73% indicating their relevance to the learning process. The analysis also revealed significant improvement in reflective capabilities, with 83.5% of participants reporting enhanced ability to engage in metacognitive processes. Furthermore, robust peer interaction and support systems were evidenced by high satisfaction rates ranging from 74.6% to 88%, indicating strong collaborative learning engagement. Finally, students expressed strong appreciation for pedagogical flexibility, with 89.5% valuing the ability to choose appropriate

learning methods. These consistently high positive responses across all dimensions provide compelling evidence for the effectiveness of the flipped classroom's pedagogical engineering in supporting learner participation.

H2: Students identify the reinforcement of learning support mechanisms as one of the most crucial measures for improving flipped classroom implementation.

The second hypothesis finds support in the data, albeit with important nuances that warrant careful consideration. A significant proportion (36.2%) of participants explicitly identified enhanced accompaniment as a primary improvement need, while 35.8% indicated insufficiency in current support tools, suggesting a clear demand for strengthened support mechanisms. The analysis revealed notable variations in satisfaction across different support types, indicating the need for systematic enhancement of support structures. This finding is particularly significant given the strong correlation observed between support quality and perceived learning effectiveness. These results suggest that while the flipped classroom model does emphasize learning support mechanisms, there remains substantial room for improvement in both the quantity and quality of support provided to students, particularly in terms of technological tools and methodological guidance.

Study Limitations and implications

Limitations

The study presents several methodological constraints that warrant consideration. Primary among these is the reliance on self-reported data, which, as Deschryver and Lebrun (2014) note, may not perfectly align with actual learning outcomes. The sample size (n=67, 65% response rate) and its specificity to particular academic programs at a single Moroccan institution limit the generalizability of findings. Additionally, the cross-sectional nature of the study provides only a temporal snapshot of student perceptions, preventing longitudinal analysis of how these perceptions might evolve over time (Strohmyer, 2016).

Implications

The findings yield several significant implications for educational practice regarding:

- Pedagogical Design: Results indicate the necessity for systematic integration of support mechanisms within flipped classroom design, balancing technological innovation with pedagogical effectiveness.

- Implementation Strategy: The study emphasizes the importance of comprehensive instructor training programs addressing both technological and pedagogical aspects of flipped classroom methodology.
- Institutional Support: Findings highlight the crucial role of robust technological infrastructure and professional development programs in successful implementation.

Conclusion

This study has provided comprehensive insights into student perceptions of flipped classroom implementation in higher education, with particular focus on the Faculty of Letters and Human Sciences of Oujda, Morocco. Through systematic analysis of five key dimensions - presence/distance articulation, mediatization, mediation, accompaniment, and openness - the research has revealed both the strengths and areas for improvement in flipped classroom implementation.

The findings strongly support the effectiveness of flipped classroom methodology in promoting active learning and developing diverse competencies. The high percentage of students reporting enhanced active learning (89.5%) and strong articulation between presence and distance components (91%) demonstrates successful integration of what Charlier et al. (2006) term "hybrid characteristics." This success is particularly noteworthy in the Moroccan higher education context, where traditional teaching methods have historically predominated.

The study's examination of support mechanisms revealed complex patterns across different forms of accompaniment. While students reported high satisfaction with metacognitive guidance (86.5%) and peer support systems (74.6% - 88%), the findings also indicated areas requiring attention, particularly in terms of methodological support and resource provision. These results align with Tully's (2014) observation regarding the critical role of comprehensive support structures in successful flipped classroom implementation.

The research validates both initial hypotheses while providing nuanced understanding of their manifestations. The first hypothesis, concerning effective learner participation, is strongly supported across all five theoretical dimensions. The second hypothesis, regarding the importance of learning support mechanisms, is also confirmed, though with important qualifications regarding the specific types and levels of support required.

Looking forward, this research contributes to the growing body of knowledge about flipped classroom implementation in developing educational contexts. The findings suggest that successful implementation requires careful attention to:

- The integration of technological and pedagogical elements
- The provision of comprehensive support structures
- The development of appropriate digital resources
- The cultivation of collaborative learning environments

These insights are particularly valuable for institutions implementing flipped classroom methodologies in similar contexts. This study provides evidence-based guidance for the implementation of active learning approaches while maintaining pedagogical effectiveness while highlighting areas requiring further investigation.

Finally, while acknowledging the study's limitations, particularly regarding sample size and institutional specificity, the findings provide a strong foundation for future research. Additional studies examining longitudinal outcomes, cross-institutional comparisons, and objective performance measures would further enhance our understanding of flipped classroom effectiveness in diverse educational contexts.

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