

From Dialogic Lessons to Expository Lectures: A Transitional Challenge for Science Students in Algerian Universities (Case of First-Year Biology at Blida 1)

من الدروس الحوارية إلى المحاضرات الإلقائية: تحدي طلبة العلوم في الجامعات الجزائرية (طلبة السنة الأولى بيولوجيا بجامعة البليدة 1 أنموذجا)

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Abstract:

This study examines how the transition from a dialogic, teacher-guided lesson in the 3rd year of secondary (high) school (3e AS) to a large expository lecture (transmissive CM) in the first year of university (Life and Nature Sciences) shapes Biology students' engagement and learning at Blida 1 University in Algeria. Using a corpus comprising one dialogic secondary-school French lesson and three university lectures (Cytology, Animal Biology, Plant Biology), complemented by questionnaires and semi-structured interviews, we show that the sharp reduction of classroom interaction at entry into Year 1- within a French-medium environment where French functions as a second/foreign language (L2/FL) - undermines disciplinary terminology uptake, lowers reported motivation, and coincides with weaker early assessments. We interpret these findings through constructivist/socio-constructivist, cognitive-load, and

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self-determination lenses, and propose feasible lecture hybridization compatible with local constraints.

Keywords: dialogic lesson; expository lecture (CM); EAP/ESP (FOU); Biology; Algeria; motivation; cognitive load; academic literacy; hybrid pedagogy.

ملخص:

تتناول هذه الدراسة أثر الانتقال من الدرس الحواري في السنة الثالثة ثانوي إلى الدرس الجامعي ذي الطابع الإلقائي (CM) في السنة الأولى بجامعة البليدة 1 (تخصص علوم الطبيعة والحياة) بالجزائر، على مشاركة الطلبة وتعلمهم. بالاعتماد على مدونة تتكون من درس حوار في الفرنسية بالثانوي وثلاث محاضرات جامعية (علم الخلية/الانقسام الخلوي، البيولوجيا الحيوانية/الجهاز التناسلي الأنثوي، البيولوجيا النباتية/النسيج المؤلّد)، إضافة إلى استبيانات ومقابلات، تُظهر النتائج أن تراجع فرص التفاعل الشفهي عند الالتحاق بالجامعة - في سياق تُدرّس فيه المحاضرات بالفرنسية كلغة أجنبية - يضعف تملك المصطلحات، ويقلّص الدافعية المدركة، ويتزامن مع أداءٍ أوليٍّ أقلّ في التقييمات. نناقش النتائج في ضوء المقاربات البنائية/البنائية الاجتماعية، ونظرية العبء المعرفي، ونظرية التحديد الذاتي للدافعية، ونقترح صيغاً عملية لـ«تجهين» المحاضرة عبر إدماج مهام قصيرة لتتمكّن وأدوات لغوية (معاجم نائية، صيغ نموذجية، مخططات موجهة) مناسبة للسياق المحلي.

كلمات مفتاحية: الدرس الحواري؛ المحاضرة الإلقائية؛ الفرنسية لأغراض جامعية (FOU)؛ بيولوجيا؛ الجزائر؛ الدافعية؛ العبء المعرفي؛ الثقافة الأكاديمية؛ التجهين البيداغوجي.

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1. INTRODUCTION

In Algerian higher education, the transition from the 3rd year of secondary (high) school to the first year of university entails a simultaneous shift in pedagogic format, classroom discourse, and language of instruction. In the final year of secondary school, students typically experience a dialogic, teacher-guided sequence where questions, uptake, and reformulations render criteria explicit, foster metadiscourse, and anchor school-literacy practices. Upon entering university - specifically the Life and Nature Sciences track - new entrants confront large expository lectures: information density rises, coverage accelerates, and opportunities for student talk shrink.

The shift is compounded by a change in medium of instruction: while science and mathematics in secondary school are taught mainly in Arabic (with occasional French/English terms), first-year science at university is taught predominantly in French, with intermittent references to English terminology and to Arabic. For many students, French functions as a language for academic purposes rather than as the primary language of schooling. Consequently, the appropriation of disciplinary terminology, genre-based expression, and cross-modal literacy (talk ↔ text ↔ diagram) becomes a central EAP/ESP concern.

Within this configuration, we investigate how the move from dialogic lessons to expository lectures affects students' motivation, disciplinary understanding, and early performance, and we outline pragmatic hybridizations—short appropriation tasks, bilingual didactised lexicons, structured note-taking - that

maintain curricular coverage while reinstating interaction and language scaffolding in the Algerian university context.

2. Statement of the problem

At Blida 1 University, the transition from 3rd year of secondary (high) school dialogic teaching to Year-1 expository lecturing involves simultaneous change in format and in French-medium instruction. This reconfiguration may reshape how first-year Biology students appropriate dense, terminology-rich content that is diagrammatic and number-heavy. Our guiding question is: **To what extent would the move from dialogic lessons to expository lectures depress motivation, hinder conceptual understanding, and coincide with weaker initial performance among first-year Biology students at Blida 1?** More specifically, does the reduction of interaction in lectures, combined with EAP/ESP demands in French, constrain students' **capacity to act (agency)** and complicate meaning-making?

3. Research Hypotheses

H1

The transition to expository lecturing would be associated with a decrease in motivation and self-efficacy, likely manifesting as reduced participation and a tilt toward verbatim rather than structured note-taking.

H2

Students with dialogic exposure in the 3rd year of secondary school would report better comprehension of disciplinary concepts than peers immersed directly in transmissive lectures; this would appear in performance on EAP/ESP-typical tasks (define, paraphrase, describe a diagram).

H3

Fewer opportunities for uptake and limited scaffolding in lectures would coincide with weaker early performance (MCQs, tutorials, labelled diagrams), particularly where terminology and graphic density would be high and language mediation would be absent.

H4

Incremental lecture hybridization - via short appropriation tasks (2-10 minutes), bilingual didactised lexicons (FR↔AR with EN cues), and structured note frames - would enhance perceived clarity and would strengthen comprehension without sacrificing coverage; it would also raise spontaneous participation and question quality.

H5

In predominantly transmissive settings, first-year Biology students would express greater need for academic and language support (peer tutoring, terminology workshops, Q&A forums, banks of annotated diagrams) to compensate for limited interaction and secure the school-to-university transition.

4. Theoretical Framework

4.1 Dialogic teaching and sociocultural grounding

In dialogic, interaction-rich classrooms, talk is treated as a joint intellectual activity through which knowledge is co-constructed and assessment criteria are made visible. Teacher moves such as authentic questioning, uptake, and reformulation externalise reasoning, reduce ambiguity about task expectations,

and create repeated occasions for terminology uptake within meaningful exchanges - an important affordance when French operates as a foreign language. These principles are consistent with socio-constructivist accounts of learning as guided participation in culturally organised activity (Alexander, 2008; Vygotsky, 1978) and with evidence that dialogic discourse supports conceptual change and disciplinary language growth in content classrooms (Mercer, 2000; Snow & Uccelli, 2009).

4.2 Lecture, engagement, and the ICAP hypothesis

Lecture-based courses efficiently deliver coverage but often concentrate engagement at the passive/active end of the spectrum (listening, note-taking) unless deliberately hybridised. The ICAP framework predicts deeper learning when activities elicit constructive (self-generated inferences, paraphrases) and interactive (co-construction) behaviours (Chi & Wylie, 2014). Small, time-bounded prompts embedded inside lectures (e.g., “muddiest point,” micro-MCQs, cloze labelling of diagrams) can shift participation upward on the ICAP scale without compromising pacing, an approach aligned with research on active learning in large undergraduate cohorts (Prince, 2004; Freeman et al., 2014).

4.3 Cognitive load, signalling, and guided multimodality

First-year Biology lectures layer specialised lexis, dense visual representations, and numeric/ordinal detail; in a French as a foreign language environment, this can inflate extraneous load and depress germane processing if signalling and scaffolding are scarce. Cognitive Load Theory recommends segmentation (short conceptual chunks), signalling (verbal/visual cues), and pre-training (front-loading key terms/graphics) to stabilise working

memory demands (Sweller, 1988; Sweller, van Merriënboer, & Paas, 2019). Multimedia Learning research converges on similar design principles for text–image integration and terminology pre-training in science topics (Mayer, 2009/2021). In practice, pragmatic hybridizations of lectures—bilingual term lists, model phrasing for diagram description, and structured note frames - operationalise these principles for local classrooms.

4.4 Self-determination, reported motivation, and agency

Transitions that curtail interaction also curtail students' sense of competence, autonomy, and relatedness - the psychological needs that underpin reported motivation (Deci & Ryan, 2000; Ryan & Deci, 2017). Brief in-lecture opportunities to contribute (pair-checks, minute papers, targeted reformulations) can restore controllability and promote a feeling of progress, which is particularly salient for newcomers negotiating both disciplinary content and a French as a foreign language medium.

4.5 ESP/FOU, academic literacy, and terminology uptake

In ESP/FOU contexts, disciplinary learning and academic literacy (structured note-taking, paraphrase, diagram description) co-develop. Bilingual term lists (FR↔AR with EN cues), explicit modelling of disciplinary phrasing, and lacunary templates for notes and figure labelling provide a didactic bridge that supports terminology uptake without diluting disciplinary French (Mangiante & Parpette, 2004; Snow & Uccelli, 2009). Within Algeria's plurilingual ecology, planned cross-repertoire mediation (FR/AR/EN) can further stabilise meaning when

embedded purposefully inside lectures (García & Wei, 2014).

5. Methodology

5.1 Corpus and context

The dataset spans two levels. At secondary (3rd year of high school), we analyzed a dialogic French lesson on summarizing techniques - rich in student turns and explicit metadiscourse. At university (Year 1 Biology), we observed three expository lectures: Cytology—Cell Division, Animal Biology - Female Reproductive System, and Plant Biology - Vascular Cambium. Lectures were predominantly in French, with occasional AR/EN terms, and delivered to large cohorts typical of Algerian science programmes.

5.2 Instruments and data sources

We collected full-session audio recordings, fine-grained transcripts (turn-taking, address markers, relevant hesitations), and supporting artefacts (handouts, projected diagrams, teacher lexicons). A descriptive questionnaire gauged language profile, self-efficacy, participation, terminology challenges, and note-taking practices. Semi-structured interviews (20-30 minutes) with a subsample of students and lecturers probed the secondary-to-university transition, the role of language in disciplinary learning, and support needs.

5.3 Units of analysis and operational definitions

Focusing on interaction density, we defined an interaction as (a) a teacher question followed by at least one student contribution, or (b) a spontaneous student contribution acknowledged or taken up by the teacher. Rhetorical questions without audible uptake and indistinct choral responses were

excluded. Sessions were segmented into thematic units (e.g., “method recall,” “mitosis/meiosis,” “growth rings”), then coded turn-by-turn for role (teacher/student), function (question, response, uptake, reformulation), dominant language (FR/AR/EN), and presence of supports (diagram, handout, lexicon).

5.4 Coding procedure and reliability

Coding proceeded in two passes: an initial spotting of interactional zones, followed by a validation pass using a decision grid with borderline cases. To stabilize decisions, 20% of the corpus underwent internal verification for intra-coder consistency. Disagreements (e.g., rhetorical vs effective question) were resolved on the basis of audibility and explicit uptake.

5.5 Data treatment and ethics

Interactional data were summarized with descriptive statistics (totals per session, relative frequencies by type, ratios of “questions with uptake / duration”). Questionnaire responses were reported as frequencies and medians/IQRs. Verbatim excerpts were selected for illustrative value and aligned with EAP/ESP issues (academic literacy, cognitive load, agency). Participants were informed; identifiers were anonymized; materials were stored securely.

6. Results

We present our results from global to situated:

(1) quantitative comparison of interactions;

- (2) quantitative tendencies for motivation and comprehension;
- (3) illustrative excerpts with extended commentary;
- (4) a cross-cutting synthesis.

Each subsection ends with a brief summary to support readability.

6.1 Quantitative comparison of interaction

Table 1. Interaction counts in the corpus: High school 3rd year dialogic lesson Vs three expository L1 lectures

Session (discipline)	Format	Total interactions	Teacher questions followed by student uptake	Spontaneous student turns
High school 3rd year – French module (summarising technique)	Dialogic	150	92	58
Year 1 - Cytology module (Cell division)	Lecture	23	14	9
Year 1 - Animal Biology module (Female reproductive system)	Lecture	18	11	7
Year 1 - Plant Biology module (Vascular cambium)	Lecture	13	8	5

Commentary

The secondary-level dialogic lesson concentrates six-to-eleven-fold more interaction than each university lecture considered separately. Beyond totals, the profile differs: the

dialogic lesson shows a marked share of spontaneous turns ($\approx 39\%$), signaling stronger agency. In Year 1 lectures, interaction - when present - mostly stems from teacher questions and results in short sequences, limiting co-construction of meaning.

Summary 1

Expository lectures display a sharp drop in interaction and a shift away from spontaneity, supporting the hypothesis of reduced opportunities for verbalization.

6.2 Quantitative tendencies (motivation and comprehension)

Motivation

Students report lower interest and self-efficacy under expository lecturing, with a drift toward verbatim note-taking at the expense of structured notes.

Comprehension

Difficulties rise when terminology is not re-contextualized (e.g., mitosis/meiosis; light/dark bands in wood) and when numerical/ordinal values stack without paraphrase.

Performance

Early assessments (MCQs, tutorials, labelled diagrams) tend to be weaker for students perceiving fewer interactional opportunities.

Summary 2

Reduced interaction coincides with lower motivation and fragile comprehension, especially in terminology-dense, diagram-rich segments.

6.3 Course excerpts and commentary

Excerpt A – High school 3rd year (dialogic, French)

“...c’est un texte expositif... nous avons trois paragraphes... introduction, développement, conclusion... je vais vous poser une question... quel est le thème du texte ?...”

Comment

The teacher alternates open questions, uptake, and reformulation; these moves surface criteria (“identify the topic,” “locate key words”) and lower extraneous load by clarifying what is expected. Students verbalize procedures (naming, classifying, justifying), which supports semantic encoding and consolidation of school-literacy categories (introduction/body/conclusion). Spontaneous turns emerge in response to guided prompts, indicating agency.

Excerpt B – Year 1 (Cytology, lecture)

“...on est obligés d’utiliser le polycopié... il y a des explications... celui qui veut réussir doit être assidu... puis mitose/méiose...”

Comment

Expectations are set (attendance, status of the handout), yet the ensuing exposition remains dense and unbroken, with limited micro-pauses for paraphrase or model phrasing for diagram description. In ICAP terms, engagement hovers between passive and active, with scarce constructive or interactive opportunities.

Excerpt C – Year 1 (Animal Biology, lecture)

“...à la naissance... environ 400 000 ovocytes... à la puberté 200

000... au 14e jour... ovulation...”

Comment

The causal chain is rigorous, but stacked numbers and temporal markers delivered without signaling (segmentation, oral highlighting, guided bilingual paraphrase) can overload working memory in L2/FL contexts. Short in-lecture appropriation tasks (label a cycle, complete a diagram, compare two trajectories) would reduce extraneous load and trigger relational processing.

Excerpt D – Year 1 (Plant Biology, lecture)

“...zone claire/zone sombre... anneaux de croissance... chaque anneau représente une année... tout dépend du climat...”

Comment

The visual analogy is productive for multimodal anchoring (image ↔ lexicon), but without an operative task (compare sections; justify ring-width variation), activity remains expository. A bilingual didactised lexicon and cloze-style labelling template would stabilize key terminology (light/dark zone, cambium, xylem) and scaffold disciplinary description.

Summary

Interactional form conditions language-and-content appropriation: dialogic sequences multiply opportunities for co-construction, whereas unmediated exposition tends to overload processing and dampen agency.

6.4 Synthesis of findings

Together, these results argue for pragmatic lecture hybridization in Year-1 Biology: insert short appropriation tasks (2-10 minutes), model structured note-taking (lacunary templates, cloze labelling), and provide bilingual didactised terminology. These adjustments enhance engagement, clarify expectations, and reduce extraneous load without compromising curricular coverage.

7. Discussion

7.1 Format shift and discourse posture

The contrast between dialogic and expository regimes is qualitative, not merely quantitative. Dialogic sequences promote externalization of reasoning and metacognitive checking; under L2/FL conditions, fewer verbalization opportunities would weaken gradual concept building and study routines, partially explaining the difficult first-semester transition.

7.2 Language load and cognitive load

University excerpts stack specialized lexis, diagrams, and numbers. Without guided multimodality (pre-training, segmentation, signaling), extraneous load inflates, and students gravitate toward verbatim notes. In line with multimedia learning principles, brief appropriation tasks at the point of need can “recycle” input into stable representations.

7.3 Motivation and agency

Declines in self-efficacy reflect diminished controllability. Routine entry points (minute papers, pair checks, guided reformulations) would restore control, agency, and interest,

cohering with Self-Determination Theory.

7.4 FOU/EAP as an integrated operating mode

Rather than a separate module, EAP/ESP is an embedded practice: bilingual didactised lexicons, model sentences for diagram description, lacunary note frames, and explicit criteria for disciplinary genres. Implemented inside lectures (2–10 minutes), they balance coverage and appropriation.

7.5 Alternative explanations and reflexivity

Heterogeneous French proficiency, transition stress, lecturer style, and content abstraction may co-produce observed effects. Quasi-experimental designs and independent double-coding would refine inferences.

7.6 Scope and transferability

Although grounded in Blida 1 Biology, the mechanisms (interaction → terminology appropriation → engagement) are transferable across Algerian science programmes where instructional French diverges from students' main school language. The proposed tools are low-cost and scalable.

8. Pedagogical Implications (Classroom design)

Short in-lecture appropriation tasks

Insert 2-10-minute activities at pedagogically strategic points: minute papers (one clarified point/one muddy point), diagnostic micro-MCQs, or concept-map completions keyed to a projected diagram. These tasks surface student conceptions and enable just-in-time checks.

Language-of-instruction scaffolds (FOU/EAP)

Treat disciplinary French as language of teaching (LDE) and object of learning. Use a bilingual didactised lexicon (FR↔AR with EN cues), guided reformulation (“explain in your own words,” “describe the figure”), and model sentences to reduce extraneous load and stabilize terminology in a plurilingual setting.

Structured note-taking

Shift from verbatim to structured notes by providing lacunary templates, cloze labelling for key figures, and visual coding for stages (e.g., mitosis vs meiosis). This guidance is crucial in terminology-dense chapters.

Case-based tasks grounded in the corpus

Build short cases from authentic excerpts (light/dark zones & growth rings; ovulation & hormonal variation; simple chromosomal anomalies) with targeted prompts (label/compare/infer) to move activity toward constructive/interactive levels.

Academic and community supports

Provide peer tutoring, terminology workshops, and chapter-based Q&A forums (in-person/online), underpinned by a shared bank of annotated diagrams (complete and to-complete versions) for revision and self-assessment.

9. Limitations and Perspectives

Sample scope

The corpus derives from a single cohort and site; rich

contextual description trades off with generalizability. Replication across sites/disciplines would strengthen external validity.

Measurement and inference

Findings are descriptive trend comparisons; the absence of independent double-coding is a limitation. Future iterations should adopt a shared coding protocol, calibration sessions, and reliability indices.

Quasi-experimental consolidation

The design does not warrant strong causal claims. Quasi-experiments (lecture vs lecture + dialogic capsules) with pre/post measures of comprehension, motivation, and agency would be informative.

Longitudinal follow-up

Track effects across semesters 1-2 (and Year 2) to map trajectories of terminology appropriation and academic outcomes (grades, deferrals, reorientation).

Plurilingual ecology and contextual variables

Model AR/FR/EN dynamics, cohort size, scheduling, and lecturer style as moderators of interactional effects.

Ethics and data granularity

Anonymization protects participants but limits individual-level analysis. With enhanced consent, stable pseudonyms would allow finer interactional tracing.

10. CONCLUSION

At the 3rd year of high school → Year 1 threshold, the reduction of interaction in large lecture-based courses-within a French as a foreign language setting-emerges as a risk factor for disciplinary language appropriation and early academic engagement. Rather than opposing dialogic lessons and lectures, we argue for pragmatic hybridization of lectures: short, time-bounded tasks, ESP/FOU terminology work, structured note frames, and case-based prompts that preserve coverage while restoring opportunities for uptake, feedback, and academic literacy in use.

Operationally, these adjustments can be embedded in existing timetables (2-10-minute slots), supported by bilingual term banks and a shared repository of annotated figures, and sustained through light-touch lecturer development focused on signalling/segmentation and guided reformulation. Framed through constructivist/socio-constructivist, cognitive load, and self-determination perspectives, the approach is compatible with local constraints (large cohorts, tight pacing) and attentive to equity across heterogeneous language profiles.

Looking ahead, programme-level pilots should pair implementation with simple, transparent evaluation - tracking terminology uptake, reported motivation, and early assessments - to iteratively calibrate the balance between coverage and interaction. In Biology at Blida 1 and comparable Algerian contexts, such hybridizations of lectures offer feasible levers for improving first-year outcomes without inflating resources, while laying foundations for a culture of data-informed teaching in ESP/FOU settings.

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