

Research Article

Jigsaw as a Collaborative Learning Structure in ESP Higher Education: A Framework for Three Disciplines at the Catholic University of Mozambique, Nacala

Elisio Alberto Tomas* 

Department of Port Management, Accounting and Human Resource Management, Catholic University of Mozambique, Nacala-Porto, Mozambique

Abstract

This conceptual and practice-based article, which reports no empirical data, argues that the jigsaw activity is structurally suited to English for Specific Purposes (ESP) instruction in higher education. Three ESP courses in Mozambican higher education Business English for Human Resource Management, Maritime and Port English for Port Management, and English for Accounting prepare students for professional contexts in which communication is inherently collaborative, yet delivery typically remains teacher-centred. The jigsaw activity, a cooperative learning structure in which each student masters one segment of material and teaches it to peers, mirrors the distributed expertise of the real workplaces that ESP serves, such as the Port of Nacala. Drawing on the cooperative learning and ESP literature and on the author's teaching practice at the Catholic University of Mozambique, Nacala-Porto Extension, the article proposes a course-specific jigsaw framework that specifies, for each discipline, the carrier content, expert-group segmentation, jigsaw-group product, target language focus and individual-accountability mechanism. It grounds the design in the five conditions under which cooperative effort outperforms transmission pedagogy positive interdependence, promotive interaction, individual and group accountability, interpersonal skills and group processing and in the structural convergence between jigsaw's information-gap logic and ESP's target-situation methodology. A three-study agenda for empirical validation from the 2026 academic year is specified, comprising a quasi-experimental comparison, a cross-course implementation study and a baseline attitudes survey. The framework offers ESP practitioners in Mozambique and comparable resource-constrained contexts a concrete, locally anchored alternative to lecture-based delivery.

Keywords

Jigsaw Activity, Collaborative Learning, English for Specific Purposes, Business English, Maritime English, English for Accounting

1. Introduction

English for Specific Purposes (ESP) is defined by its orientation to the learner's target situation: course content and methodology derive from the learner's reasons for learning,

not from a general syllabus [1]. In Mozambican higher education, this orientation is concrete and local. Students of Port Management at institutions in the Nacala corridor will work

*Correspondence: Elisio Alberto Tomas (etomas@ucm.ac.mz), Elisio Alberto Tomas (eelisiothomas@gmail.com)

Received: 12 June 2026; **Accepted:** 27 June 2026; **Published:** 15 September 2026



Copyright: © The Author(s), 2026. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

in vessel operations, cargo documentation and logistics at the Port of Nacala; Human Resource Management (HR Management) students will recruit, appraise and manage personnel for employers operating in English-mediated supply chains; Accounting students will read, prepare and present financial information for firms and auditors whose working documents are increasingly in English. In all three target situations, professional communication is not an individual performance but a collaborative one: a vessel call, a recruitment process and an audit are each completed by teams whose members hold different pieces of information and must exchange them accurately.

ESP teaching, however, does not always reflect this collaborative reality. Lectures, terminology lists and individually completed exercises remain common, reproducing in the ESP classroom the transmission pedagogy that dominates much English teaching in Mozambique [2, 3]. In the author's experience teaching ESP at the Catholic University of Mozambique (UCM), Nacala-Porto Extension Business English in the HR Management programme and Maritime and Port English in the Port Management programme the default instructional pattern remains lecturer-fronted: terminology is presented, texts are read collectively, and group work, where it occurs, is unstructured, with no mechanisms securing individual participation. Students consequently graduate from courses whose target situations are intensely interactive having had little structured opportunity to interact professionally in English.

This article therefore addresses a practical question: *how can the jigsaw activity be designed and implemented as an effective vehicle for collaborative learning in ESP courses in higher education?* It pursues three objectives: (a) to establish, from the cooperative learning and ESP literature, why jigsaw is structurally suited to ESP instruction; (b) to characterise the instructional problem in the institutional context of UCM, Nacala-Porto Extension; and (c) to present a course-specific jigsaw framework for three ESP disciplines Business English for HR Management, Maritime and Port English for Port Management, and English for Accounting, together with an agenda for empirical validation. The article is conceptual and practice-based: it does not report empirical data, but converts established theory and documented practitioner experience into an implementable instructional design whose testing is specified in Section 6.

Methodologically, this article is grounded in a selective and argumentative bibliographic review of the cooperative learning and ESP literature. Sources were selected on the basis of three cumulative criteria: scholarly recognition, as evidenced by adoption in international higher-education programmes and citation in peer-reviewed ESP and applied linguistics research; direct relevance to the article's three objectives theoretical fit, institutional characterisation and framework design; and, where available, recency, with particular attention to scholarship published after 2015 and to studies conducted in African or resource-constrained higher-education contexts. The analysis proceeded in three stages: identification of the

theoretical conditions under which cooperative structures outperform transmission pedagogy; mapping of the structural convergence between jigsaw's information-gap logic and ESP's target-situation methodology; and synthesis of both into a course-specific, institutionally anchored framework. No primary data are reported; the practitioner observations in Section 3 carry the evidential weight of documented professional experience and are explicitly framed as such.

2. Literature Review

2.1. The Jigsaw Activity and Collaborative Learning

The jigsaw activity is a cooperative learning structure in which each member of a group becomes responsible for one segment of the learning material and then teaches that segment to peers, so that no member can succeed unless the whole group works together [4, 5]. Stone [6] describes its central mechanism as "cooperation by design": responsibility for a unique piece of learning obliges all students to value one another as contributors to a common task. In the standard procedure, students first study their segment in "expert groups" composed of peers holding the same segment, then return to heterogeneous "jigsaw groups" (home groups) to teach their classmates and assemble the whole. Figure 1 below illustrates this cycle.



Source: Adapted from Aronson [4] and Clarke [5].

Figure 1. The Jigsaw Learning Cycle: Expert-Group and Home-Group Phases.

Collaborative learning more broadly treats knowledge as something that emerges from active dialogue among those seeking to understand and apply concepts, rather than something delivered to students [7, 8]. What distinguishes structured cooperative learning from ordinary group work is deliberate design: genuine information gaps, individual accountability and intentionally heterogeneous groups [9-11]. Johnson, Johnson and Holubec [12] identify five conditions under which collaborative effort outperforms competitive and individualistic effort: positive interdependence, face-to-face promotive interaction, individual and group accountability, interpersonal skills and group processing. Where these conditions are absent, free-riding and dominance by stronger students predictably follow.

Recent scholarship confirms and extends these foundational findings. Veldman, Tartwijk, Brekelmans and Wubbels [13]

demonstrate that positive teacher-student relationships mediate the effectiveness of cooperative structures, a finding with direct implications for ESP contexts where student motivation is instrumentally anchored. Bada and Olusegun [14] confirm constructivist benefits of cooperative learning for L2 acquisition in African higher education settings analogous to those described here, reporting gains in both language confidence and content retention. Internationally, meta-analyses continue to support cooperative learning's advantage over individual and competitive structures for academic achievement [15].

2.2. ESP and the Case for Collaborative Methodology

ESP is distinguished from general English teaching by needs analysis and by the relationship between carrier content and real content: the disciplinary material (a bill of lading, a balance sheet, a job advertisement) carries the language being taught [16]. Basturkmen [17] emphasises that ESP courses aim at enabling performance in target situations, which implies that classroom activity should rehearse the communicative events of those situations, not merely describe them. Hyland [18] makes the parallel point for academic purposes: learners are being socialised into discourse communities, and socialisation occurs through participation. More recently, Paltridge and Starfield [19] argue that ESP pedagogy must account for genre and discourse community membership as social processes, reinforcing the case for collaborative over transmission models.

This is where the structural fit between jigsaw and ESP becomes apparent. The defining feature of jigsaw distributed information that must be exchanged for the group to succeed is also the defining feature of professional communication in the target situations ESP serves. A port operations team genuinely consists of members with different expertise (documentation, stevedoring, safety) who must brief one another; an audit team divides the financial statements among its members; a recruitment panel pools different evaluations of a candidate. A jigsaw lesson is therefore not merely a motivational device in ESP: it is a simulation of the target communicative event itself, satisfying the authenticity criterion that ESP methodology demands [16].

Cooperative language learning research supports the expected linguistic benefits: interactive group tasks create opportunities for naturalistic acquisition, focus attention on specific lexis and functions, reduce anxiety and increase motivation [20-22]. Task-based perspectives add that when language is the instrument for completing a meaningful task rather than the object of display, learners generate their own language and create conditions for acquisition [23, 24]. For reading-heavy ESP courses such as accounting, cooperative structures have been shown to help lower-proficiency learners with vocabulary and comprehension [25, 26]. Slavin [27] notes additionally that jigsaw scales to large classes a persistent feature of

Mozambican higher education precisely because it decomposes them into small, accountable units. In African higher education contexts specifically, Owate and Okoye [28] document improved language production outcomes when cooperative structures are used in content-language integrated settings, corroborating the applicability of these findings beyond the Global North contexts that dominate the literature.

3. The Institutional Context: ESP at UCM, Nacala-Porto Extension

The framework proposed in this article was developed in, and is intended first for, a specific institutional context. UCM's Nacala-Porto extension trains students for the professional economy of the Nacala Development Corridor, and its ESP provision reflects that mission directly: Business English is taught in Year 2 of the HR Management programme, Maritime and Port English in Years 3 and 4 of the Port Management programme, and English for Accounting serves students whose professional documentation financial statements, audit files, reporting standards increasingly circulates in English. The Port of Nacala, the deepest natural port on the East African coast, is not a textbook example for these students but their probable employer and the defining institution of the local labour market.

Three features of the teaching situation, drawn from the author's sustained practice in these programmes, define the instructional problem the framework addresses. First, delivery is predominantly transmissive: ESP sessions centre on the presentation of terminology and the collective reading of texts, with the lecturer as the principal speaker. Second, where group work occurs it is typically unstructured tasks are assigned to groups without segmented information, defined roles or individual-accountability mechanisms and exhibits the predictable pathologies documented in the cooperative learning literature: dominance by stronger students, passivity and free-riding by others, and group products that reflect the work of a minority [9, 12]. Third, students are visibly receptive to interaction: instrumentally motivated by clear professional targets, they engage readily when speaking tasks are tied to recognisable workplace scenarios such as a vessel call or a job interview.

Two boundaries of this characterisation should be stated plainly. It is a practitioner account, not a formal empirical study: no systematic observation or survey data from the institution are reported here, and the claims above carry the evidential weight of documented professional experience, no more. And it describes one institution; the extent to which the same pattern holds across Mozambican higher education is an empirical question. Both limitations are answerable by the research agenda in Section 6, which specifies how the framework and the characterisation that motivates it will be tested at the institution from the 2026 academic year.

4. A Jigsaw Framework for ESP in Higher Education

4.1. Design Principles

Five principles govern the framework, derived from the conditions identified by Johnson, Johnson and Holubec [12] and from ESP methodology [16, 17]:

(1) *Authentic segmentation*. The material is divided along the lines of real professional division of labour, not arbitrarily. Expert groups correspond to roles that exist in the target workplace, so that the jigsaw exchange rehearses an authentic communicative event.

(2) *Carrier content from the local target situation*. Materials are drawn from or modelled on the documents and scenarios students will actually encounter the Port of Nacala for Port Management, Mozambican employers and labour-law contexts for HR Management, Mozambican company reports for Accounting satisfying the ESP requirement that carrier content reflect the target situation [16].

(3) *A required group product*. Each jigsaw cycle ends in a concrete deliverable a briefing, a procedure, a presented summary that cannot be assembled unless every segment has been taught and understood, securing positive interdependence.

(4) *Individual accountability*. Every cycle includes a mechanism individual quiz, random presenter selection, cross-segment questioning ensuring that no student can pass through on peers' work, directly addressing the free-riding and dominance behaviours documented in the cooperative learning literature [12].

(5) *Explicit language focus*. Each cycle specifies target lexis, structures and functions, with feedback and language-focus stages built into the lesson plan, so that fluency work does not displace attention to accuracy [23].

4.2. Course-Specific Applications

Table 1 operationalises the framework for the three ESP courses. Groups of four are assumed; classes are divided into parallel jigsaw groups, and expert groups are formed across them in the standard manner.

Table 1. Jigsaw framework applied to three ESP courses in higher education.

Course / Programme	Business English (Year 2, HR Management)	Maritime and Port English (Years 3-4, Port Management)	English for Accounting (Year 1, Term 1)
Carrier content	The recruitment and selection cycle of a Mozambican employer	Cargo and vessel operations at the Port of Nacala	The annual report of a Mozambican company
Expert-group segments	(1) Job advertisements	(1) Vessel types and particulars	(1) Balance sheet
	(2) CV and cover-letter screening	(2) Shipping documentation (B/L, manifest)	(2) Income statement
	(3) Interviewing	(3) Cargo-handling operations	(3) Cash-flow statement
	(4) Job offers and onboarding	(4) Port safety and SMCP communication	(4) Notes and audit opinion
Jigsaw-group product	A complete written and role-played hiring procedure for a defined vacancy	An operational briefing for a vessel call, presented orally as a port-team meeting	A reconstructed and orally presented financial summary for management
Target language focus	Functional language of describing requirements, evaluating candidates, polite questioning, modality in offers	Maritime terminology, imperatives and standard phrases (SMCP), describing processes and sequences	Numerical language, trends and comparisons, hedging and reporting verbs, passive voice in disclosures
Individual accountability	Each expert submits their section in writing; random member presents the group procedure	Short individual quiz on all four segments after presentations	Each member answers one examiner question on a segment they did not prepare

Source: Elaborated by the Author (2026).

4.3. Teacher Role and Implementation

The framework repositions the lecturer from transmitter to designer and monitor: selecting and adapting carrier materials,

structuring groups heterogeneously by proficiency, floating between groups to observe and intervene, and conducting the closing feedback and language-focus stage [22, 29, 30]. Rotating roles facilitator, timekeeper, recorder, summariser distribute participation and curb dominance. A full cycle fits a

standard 90-120-minute higher-education session: segment study and expert groups (30-40 minutes), jigsaw teaching and product assembly (30-40 minutes), presentation, accountability check and language focus (20-30 minutes). The principal implementation costs are preparation of segmented authentic materials and initial student orientation; both diminish after the first cycles, and materials are reusable across cohorts.

5. Discussion

The framework's central claim is that jigsaw is not generically "a good activity" imported into ESP, but a structure whose logic coincides with the logic of ESP itself. ESP justifies classroom activity by reference to target situations [16]; jigsaw's information-gap architecture is the communicative architecture of those target situations. This coincidence answers the most common objection to communicative methodology in content-oriented courses that group activities sacrifice disciplinary content for talk. In a well-designed ESP jigsaw, the talk is the disciplinary content: explaining a cash-flow statement to a peer, or briefing a team on cargo documentation, is simultaneously language practice and professional rehearsal.

The institutional characterisation in Section 3 sharpens the practical argument. If the students in these programmes are instrumentally motivated and engage readily with workplace-anchored speaking tasks, and if the observed barrier is unstructured instructional design rather than learner resistance or class size, then the constraint on adoption is a design and training problem exactly the problem a specified framework addresses. The framework's individual-accountability mechanisms respond directly to the pathologies of unstructured group work: where group products invite name-adding without participation, random presenter selection and cross-segment questioning make non-participation visible and costly [12].

Honest limits must be stated. The framework has not yet been empirically tested with higher-education ESP students; its supporting evidence comes from the cooperative learning and ESP literature and from documented practitioner experience at one institution. Disciplinary lecturers may resist the time cost relative to syllabus coverage, and proficiency heterogeneity in Mozambican university intakes may strain expert groups in early cycles. Contextual constraints specific to sub-Saharan African higher education large class sizes, irregular timetabling, variable access to authentic materials add implementation risks not encountered in the settings that dominate the cooperative learning literature [28, 31]. These are researchable questions, not refutations, and they define the agenda below.

6. A Research Agenda

Three studies, all sited at UCM, Nacala-Porto Extension,

would convert this framework from proposal to evidence. First, a quasi-experimental study within one course for example, Maritime and Port English comparing jigsaw-taught and conventionally taught groups on speaking performance and terminology retention across a semester. The study would involve approximately 60 students (30 per condition), measured by a validated speaking rubric and a terminology recall test at baseline and end-point. Second, a cross-course implementation study documenting adaptation, time costs and student response across the three disciplines, using structured lesson observation and instructor diaries over two semesters. Third, a baseline attitudes survey of ESP undergraduates in the three programmes, using a validated Likert-scale instrument [15] to establish students' dispositions towards collaborative learning before implementation and to test the practitioner characterisation offered in Section 3 against systematic data. The author's own teaching responsibilities Business English (Year 2, HR Management) and Maritime and Port English (Years 3-4, Port Management) make the institution a natural site for all three studies, the first of which is planned for the 2026 academic year.

7. Conclusion

This article has argued that the jigsaw activity is a structurally appropriate vehicle for collaborative learning in ESP in higher education, and has specified what that means in practice for Business English, Maritime and Port English, and English for Accounting at UCM, Nacala-Porto Extension. The case rests on the convergence of three lines of support: cooperative learning theory, which specifies the conditions under which collaboration outperforms transmission [12]; ESP methodology, which demands that classroom activity rehearse authentic target communication [16]; and the institutional context itself, in which receptive, instrumentally motivated learners face instruction that limits their collaborative opportunity for reasons of method, not circumstance. The proposed framework gives ESP practitioners a concrete, locally anchored design for closing that gap. Its empirical validation, beginning at the institution in the 2026 academic year, is the necessary next step.

Abbreviations

ESP	English for Specific Purposes
EAP	English for Academic Purposes
HR	Human Resource (Management)
SMCP	Standard Marine Communication Phrases
TBL	Task-Based Learning
UCM	Catholic University of Mozambique

Author Contributions

Elisio Alberto Tomas: Conceptualization, Data curation,

Formal Analysis, Investigation, Methodology, Project administration, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing

Conflicts of Interest

The author declares no conflicts of interest.

References

- [1] Hutchinson, T., & Waters, A. (1987). English for specific purposes: A learning-centred approach. Cambridge University Press.
- [2] Holliday, A. (1994). Appropriate methodology and social context. Cambridge University Press.
- [3] Langa, M. (2013). Higher education in Mozambique. African Minds.
- [4] Aronson, E. (2008). The jigsaw classroom. Social Psychology Network. <https://www.jigsaw.org>
- [5] Clarke, J. (1994). Pieces of the puzzle: The jigsaw method. In S. Sharan (Ed.), Handbook of cooperative learning methods (pp. 34-50). Praeger.
- [6] Stone, J. M. (1990). Cooperative learning and language arts: A multi-structural approach. Resources for Teachers.
- [7] Hiltz, S. R., & Wellman, B. (1997). Asynchronous learning networks as a virtual classroom. Communications of the ACM, 40(9), 44-49. <https://doi.org/10.1145/260750.260764>
- [8] Gerlach, J. M. (1994). Is this collaboration? In K. Bosworth & S. J. Hamilton (Eds.), Collaborative learning: Underlying processes and effective techniques (pp. 5-14). Jossey-Bass.
- [9] Crandall, J. J. (1999). Cooperative learning and affective factors. In J. Arnold (Ed.), Affect in language learning (pp. 226-245). Cambridge University Press.
- [10] Putnam, J. W. (1998). Cooperative learning and strategies for inclusion: Celebrating diversity in the classroom (2nd ed.). Paul H. Brookes.
- [11] Brufee, K. A. (1993). Collaborative learning. Johns Hopkins University Press.
- [12] Johnson, D. W., Johnson, R. T., & Holubec, E. J. (1993). Circles of learning: Cooperation in the classroom (4th ed.). Interaction Book Company.
- [13] Veldman, M. A., Van Tartwijk, J., Brekelmans, M., & Wubbels, T. (2020). Teacher-student relationship and classroom management during cooperative learning. Teaching and Teacher Education, 90, 103020. <https://doi.org/10.1016/j.tate.2020.103020>
- [14] Bada, E., & Olusegun, O. (2015). Constructivism learning theory: A paradigm for teaching and learning. IOSR Journal of Research and Method in Education, 5(6), 66-70. <https://doi.org/10.9790/7388-05616670>
- [15] Hattie, J. (2009). Visible learning: A synthesis of over 800 meta-analyses relating to achievement. Routledge.
- [16] Dudley-Evans, T., & St John, M. J. (1998). Developments in English for specific purposes: A multi-disciplinary approach. Cambridge University Press.
- [17] Basturkmen, H. (2010). Developing courses in English for specific purposes. Palgrave Macmillan.
- [18] Hyland, K. (2006). English for academic purposes: An advanced resource book. Routledge.
- [19] Paltridge, B., & Starfield, S. (Eds.). (2013). The handbook of English for specific purposes. Wiley-Blackwell.
- [20] Kessler, C. (Ed.). (1992). Cooperative language learning: A teacher's resource book. Prentice Hall.
- [21] Nunan, D. (Ed.). (1992). Collaborative language learning and teaching. Cambridge University Press.
- [22] Bejarano, Y. (1987). A cooperative small-group methodology in the language classroom. TESOL Quarterly, 21(3), 483-501. <https://doi.org/10.2307/3586745>
- [23] Scrivener, J. (2005). Learning teaching (2nd ed.). Macmillan.
- [24] Krashen, S. (1996). The natural approach: Language acquisition in the classroom. Prentice Hall.
- [25] Alderson, J. C. (1984). Reading in a foreign language: A reading problem or a language problem? In J. C. Alderson & A. H. Urquhart (Eds.), Reading in a foreign language (pp. 1-24). Longman.
- [26] Klingner, J. K., & Vaughn, S. (2000). The helping behaviors of fifth graders while using collaborative strategic reading during ESL content classes. TESOL Quarterly, 34(1), 69-98. <https://doi.org/10.2307/3588095>
- [27] Slavin, R. E. (1994). Cooperative learning: Theory, research, and practice (2nd ed.). Allyn & Bacon.
- [28] Owate, C. N., & Okoye, N. (2020). Cooperative learning strategies and students' academic performance in English language in secondary schools in Rivers State. Journal of Education and Practice, 11(3), 55-62. <https://doi.org/10.7176/JEP/11-3-07>
- [29] McDonnell, W. (1992). The role of the teacher in the cooperative learning classroom. In C. Kessler (Ed.), Cooperative language learning: A teacher's resource book (pp. 163-174). Prentice Hall.
- [30] Richards, J. C., & Rodgers, T. S. (2001). Approaches and methods in language teaching (2nd ed.). Cambridge University Press.
- [31] Pherali, T., & Samuels, F. (Eds.). (2021). Education, conflict and development. Symposium Books.