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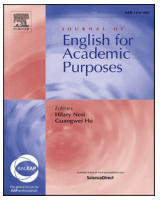

Implementing academic reading circles in higher education: Exploring perceptions, motivation and outcomes

Jennifer Rose Ament [a,*], Irene Tort-Cots [b], Elisabet Pladevall-Ballester [a]

[a] Universitat Autònoma de Barcelona, Spain
[b] Universitat de Vic, Universitat Central de Catalunya, Spain

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ABSTRACT

Academic reading is an essential yet challenging skill to teach in higher education. Research shows that academic reading circles (ARC) is a promising methodology that could improve academic reading skills but despite this, few studies have reported on the experiences and outcomes of implementing the methodology in the university setting. The purpose of this study is to investigate perceptions, motivation and outcomes of using ARC methodology in a first-year university English for academic purposes (EAP) course. 95 students and 4 instructors participated in a 16-week longitudinal study. A pre- and post-reading test was used to measure reading improvement and pre- and post-questionnaires were administered to obtain students' and instructors' experiences with the implementation of ARC and their perceptions on the impact of ARC on reading skills. Results show that while ARC is a demanding activity that requires training for instructors and scaffolding for students, students perceive ARC to have a positive impact on both their higher and lower order thinking skills and that overall reading scores significantly improve after the intervention. The findings highlight the potential benefits of ARC as an effective and useful methodology to teach critical reading skills in higher education EAP courses.

1. Introduction

Critical reading is a fundamental skill in higher education (HE), yet many students struggle to effectively analyze and interpret complex texts. While some students show signs of poor comprehension and inability to critically reflect on course reading materials, others seem to give up and disengage. This scenario is a common struggle for university faculty and students around the world (Railton & Watson, 2005). To begin with, it has been noted that the transition from high school to university is often problematic (Parker, 2003). Specifically, it has been found that first-year university students struggle to develop the study skills they need to excel in the new academic environment (Turner & Thompson, 2014). One essential study skill in HE is academic reading strategies. Reading comprehension is thought to require the engagement of higher-order and critical thinking skills as readers not only need to understand technical vocabulary and complex sentence structures but also evaluate, assess, and organize complex ideas, argumentation, and highly specialized content. These skills are rarely well consolidated in a freshman university student. Schoenbach et al. (2012) report that "close to 50% of entering students (in the United States) are not prepared for the literacy tasks expected of them" (p. 5). Despite these findings, reading seems to be poorly addressed in HE institutions. The neglect of pedagogic focus on academic reading (AR) skills

* Corresponding author.
E-mail addresses: Jenniferrose.ament@uab.cat (J.R. Ament), itort@umanresa.cat (I. Tort-Cots), elisabet.pladevall@uab.cat (E. Pladevall-Ballester).

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contrasts markedly with the amount of instruction universities usually provide on academic writing. This causes reading to be an 'invisible' skill that is erroneously assumed to self-develop (Baker et al., 2019).

Expecting students to develop advanced reading skills in isolation contrasts with reading theories proposed by researchers such as Baker et al. (2019) and Wenger (2021) who suggest that reading is a social practice where meaning must be constructed and negotiated. Others propose that it is through discourse with peers that learners can personalize their progress and become aware of different reader perspectives (Parker, 2003). The risk of leaving students to work out the complex task of AR on their own is that it is rarely effective and has been found to lead to retreat or disengagement from difficult readings. It has also been found to cause negative emotions, low self-esteem, and in the long run, can affect learning outcomes, something that could be avoided through adequate scaffolding (Kimberly & Thursby, 2020).

The reading approach implemented in the present study is academic reading circles (ARC) adapted from Seburn's (2016) methodology. This promising methodology seems to open a point of entry to complex texts for inexperienced readers and encourage dynamic and extensive reading, which allows for the discovery of deeper layers of meaning and, gives the reader a chance to interact with the text on both a personal and group level, encouraging the engagement and development of critical thinking. The introduction of ARC methodology in the present study offers an innovative way to teach AR skills to English linguistics and literature majors. So far, findings from the HE context highlight the potential usefulness of ARC in enhancing reading engagement (Marinkova and Leslie, 2021; Soliman, 2012), boosting the amount and frequency of reading strategies, and improving comprehension (Chou, 2022). However, there are few studies that investigate the effects of ARC on overall reading improvement or that report on perceptions of the methodology. Thus, the present study aims to describe the process of implementation of ARC in a first-year undergraduate course in an English Studies degree program at a Spanish university, by reporting students' and instructors' perceptions and the development of overall reading comprehension skills. The study provides insights into the process and outcomes of the methodology and informs HE educators concerned with teaching critical reading skills and how they might implement ARC in their own contexts.

2. Theoretical background

This study adopts a social-cognitive perspective toward reading. The social-cognitive perspective is rooted in principles from Vygotsky's (1978) theory on cognitive development, which argued that cognitive development is socially mediated and emphasizes the importance of reading as a social practice. It also recognizes the cognitive aspects that are involved in reading, for example the need to decode, break down larger chunks of information, monitor comprehension, build knowledge, and evaluate. The second approach that plays a key role in our theoretical framework is socio-cultural theory, a perspective that underlines the importance of cultural and social contexts in shaping reading experiences and outcomes (Bloome, 1985). It is thought that socio-cultural practices are hidden and embedded in academic writing and reading, meaning that there are "assumptions and hidden cultural values associated with disciplinary language" (Baker et al., 2019, p. 145). Not understanding or having access to these socio-cultural cues can lead to inequity. Baker et al. (2019) clearly describe the gate-keeping function that AR and writing play in the access to knowledge. These barriers can be stronger when it comes to students studying through a foreign language (see De Costa et al., 2021), which highlights the need for research on how reading is approached and experienced in HE institutions, especially by foreign language speakers.

These two theories place the social aspect of learning at the center, and, while it is easy to see the social relationship between speaking and social interaction, reading is often thought of as an individual activity that one engages in, in isolation. However, research shows that to develop critical reading skills active reading is required. Active reading requires that i) learners have a purpose for their reading (Schoenbach et al., 2012) and that ii) the reader situates themselves in relationship to the text. Only after these two requirements are met can the reader find a point of access to then be able to interact with the text and take a stance towards the contents of the text. One way for students to work out their understanding, ideas, and opinions toward the text is through discussion and negotiation (Schoenbach et al., 2012). Speaking is a powerful way to develop and articulate ideas and novice academic readers need abundant opportunities and experiences to work out their ideas.

In the 1980s a reading methodology that took both social-cognitive and socio-cultural theories into account was proposed by Palincsar and Brown (1984). The methodology, known as reciprocal teaching, was based on proleptic teaching, which refers to supporting novice readers' participation through a social activity until they are able to perform tasks unaided. Reciprocal teaching methods, consisting of creating small groups of students of mixed ability who take turns teaching sections of texts to each other, were found to have a significant positive effect on summarizing skills, ability to identify the main point and ability to ask questions demonstrating critical thinking. Furthermore, the benefits of interaction in this teaching method are thought to reinforce reasoning processes that are fundamental to text interpretation. For example, through explaining and justifying their understanding of the text students are able to break the reading down into more manageable sections (Cotterall, 1990).

Based on these two theories and what is known from research on reciprocal teaching, it seems that incorporating ARC into EAP courses might foster the social-cognitive and socio-cultural aspects of reading and provide opportunities for learners to engage with academic texts. The ARC discussion practice could give students a social purpose for their reading and help them to situate themselves with respect to the text as well as to their peers. Through the ARC practice they will be able to try on different perspectives and experiment and interact with the texts and each other to develop their own disciplinary identity through a low-stakes activity.

2.1. Reading critically

As one reads and gains knowledge from reading there is a need to comprehend, interpret, apply, analyze, synthesize, and evaluate the contents and messages encoded in the text. These skills were classified by Bloom et al. (1956) into levels of cognitive domain and

later revised by Anderson and Krathwohl (2001) into lower-order thinking skills (LOTS), namely remembering, understanding, and applying information or knowledge, and higher-order thinking skills (HOTS) which involve analyzing, evaluating, synthesizing and creating. Active AR offers learners opportunities to develop and practice their HOTS. A study by Gergera (2023) investigated which levels of thinking were activated from reading exercises from an English academic language skills textbook and how well university students perceived the exercises as enhancing their HOTS. Questionnaires and content analysis of the reading activities were carried out, and it was found that only 20% of the reading questions targeted HOTS and students did not perceive the activities as helping them develop their analytical, evaluation, or creative thinking skills. The study points out the need for a change in the type of reading activity, from comprehension questions that aim to test understanding to activities that can foster the development of HOTS. We suggest ARC as one possible solution.

2.2. Perceptions

When it comes to critical reading, university instructors and students seem to have different ideas about what is involved. Bharuthram and Clarence (2015) reported this after they surveyed students and professors and found that 80% of students had "narrow, limited or no understanding at all of what critical reading means" (p. 50). Students identified i) scanning and ii) being able to get an overview of the text as critically reading, and interpreted 'paying attention to details' as examining grammar, vocabulary, and punctuation rather than considering arguments and evidence. Lecturers, on the other hand, mentioned being able to understand what is implied, and what is absent, to pick up on nuances and possible truths, and analyze and evaluate the ideas (i.e. HOTS) as reading critically. Another obstacle to developing critical reading skills is that novice readers usually accept the text as 'truth' and do not question the ideas presented in it. This causes students to be reluctant to voice any opinions that might differ from those in the text. If instructors understand how students perceive and experience their learning, they can then adjust their pedagogy to meet the students' needs which would have an impact on learning outcomes. In addition to understanding the students' experience, instructors need to know that students cannot simply be told what critical reading is, but that they need to learn by doing. This was suggested by Railton and Watson (2005) who found that ARC was effective in promoting learner autonomy and successfully put the focus on the learning process rather than the learning outcomes.

Another reason to consider perceptions is that they are always present in a person's inner world and affect what manifests in the external world. Concerning AR, it has been found that how students perceive themselves impacts their behavior and academic achievements. For example, Gravett and Winstone (2019) found that perceptions of lack of efficacy in academics are interpreted as personal deficits and become powerful influencers that shape a student's academic self-perception. In a study on first-year students in the U.K., Kimberly and Thursby (2020) measured reading habits, perceptions, beliefs, and emotions through a questionnaire and focus group, and they also conducted workshops and observed the students. The data revealed that all students reported AR as difficult. Language and structure were the most challenging elements, and discomfort was found to increase with lack of familiarity with the text. As was reported by Schoenbach et al. (2012) "when readers are unfamiliar with language structures or features of a text their language-processing ability breaks down" (p. 19). Despite these challenges, the students mentioned that they found AR interesting and showed a willingness to learn. However, significant barriers prevented them from completing their reading homework, such as disengagement due to difficulty and the feeling that reading was a non-productive activity that took up too much time with little value to be gained. They reported frustration with managing other reading assignments and finally, they did not identify as readers. Regarding emotions, results showed that reading can simulate interest but may also sometimes overwhelm students. This can lead to boredom, stress, confusion, panic, annoyance, and feelings of demotivation. It seemed that students only reported reading useful if it was linked to an assignment or grades. These findings point out the difficulty students have finding a purpose and point of access to the readings. They do not read to learn, and they do not see the value in it when other areas are awarded more grades.

In their discussion, Kimberly and Thursby (2020) offer some possible solutions to these obstacles. Firstly, they mention "validating the reading practices that students already have and showing how they can use these to construct themselves as academic readers" (p. 11). They also suggest focusing on the dialogue of reading as a process by letting novice readers share experiences and move beyond them. A third recommendation is to bring reading into the social space of the classroom and to use playful, activity-based approaches for its integration as this could help break down the reading into manageable chunks and facilitate a holistic engagement with the texts. This paper investigates the incorporation of ARC in the classroom to teach critical reading skills at university and how it might ease some of these barriers to AR.

2.3. Previous research on ARC

The first large-scale use of reading circles was promoted by Daniels (1994) to boost literacy skills among American elementary students. This was later adapted by Furr (2004) to be used with EFL students and later adapted to the academic context by Seburn (2016). Briefly, the methodology consists of dividing the students into groups of five and assigning each group member a specific role: leader, highlighter, contextualizer, connector or visualizer. Each role is responsible for analyzing the text under a distinct lens. Students are asked to read the text and prepare for a group discussion that is carried out in class. Ideally, the students should carry out five sessions of ARC so that they experience each role once. One study on the implementation of ARC took a conversation analysis and task-based learning approach and found that ARC is a complex task that requires task management and interaction management apart from the actual ARC discussion (Le, 2021). This was especially true for the role of the leader. The results show the importance of pre-training the students on how to carry out the task, to keep them on task, and to check comprehension beforehand.

Some studies have argued that ARC can be a useful tool to promote autonomous learners who value the learning process (Railton &

Watson, 2005). Huda (2022) presents a strong argument for the incorporation of ARC into HE, in her case, to scaffold non-traditional students coming from minority backgrounds and low-income households. Others theorize on the usefulness of ARC to improve reading skills (Marinkova & Leslie, 2021), to increase engagement (Seburn, 2016), or to improve fluency in English (Soliman, 2012). However, most of these studies deal with the theoretical application of ARC to the classroom and do not report empirical findings from ARC implementation.

One study was found that did collect and analyze data quantitatively: Chou (2022). Chou focused on the use of reading strategies and the comprehension of narratives through literature circles among a group of first-year modern language degree students in Taiwan. Results showed that both the control and the ARC group improved their reading strategies but only the ARC group improved on the reading comprehension test. These findings demonstrate that the ARC methodology can provide opportunities for peer learning, the development and practice of metacognitive reading strategies and the comprehension of main ideas. It can also possibly increase long-term content retention. Building on this, Cowley-Haselden (2020) carried out an exploratory study on six EFL speakers enrolled in a master's degree in the U.K. The students were taking a pre-sessional English for academic purposes (EAP) course. She carried out four ARC sessions and found that the first ARC session was almost completely grounded in the text but that by the fourth ARC session, the participants went predominantly beyond the text level and made connections between articles and related the connections to their own experiences. The findings highlight the power of ARC to scaffold novice readers to build their knowledge and ability to critically discuss academic texts, moving from LOTS to HOTS over time. Finally, a study into engagement, perceptions and the usefulness of ARC carried out by Kang et al. (2023) on first-to fourth-year English medium-instruction students in Korea showed students were positive towards ARC and that it encouraged engagement. While first-year students or those who had never experienced ARC before were apprehensive, the other participants reported that ARC lowered stress and nervousness. The authors also noted that ARC helped students see their peers as resources for learning and learned to value others' perspectives. Finally, their participants reported that ARC was beneficial, current and that it helped them build their autonomy in learning.

Thus, based on previous literature and to contribute to the growing body of research on ARC in HE, the present study asks the following research questions.

1. Do students perceive their LOTS or HOTS to improve due to the ARC methodology?
2. Do students perceive their motivation and engagement to increase due to the ARC methodology?
3. Is there any improvement in overall reading performance after the ARC implementation?
4. What are instructors' and students' perceptions of academic reading and the benefits of the ARC methodology at the beginning and end of the course?

3. Materials and methods

3.1. Context

A first-year obligatory course in the English Studies department at a public university in Catalonia, Spain, serves as the context for this study. The students are predominately Catalan and Spanish bilinguals and speak English as a foreign language. It is a sixteen-week course focused on reading and writing for academic purposes. There are four different classes of this course, each with approximately 30–40 students, each taught by a different instructor.

The course can be considered an EAP course as efforts are made to tailor the course to fit the needs of our English Studies students and give them discipline-specific knowledge.[1] The principal aim of the course is to ensure the students have a C1 level of English according to the CEFR (Council of Europe, 2009)[2] as well as specific academic literacy skills in English: the ability to write an argumentative essay and the ability to interpret authors' argumentation and stance in academic texts. The course is designed to equip the students with the English language skills necessary to follow the rest of their degree program which is taught exclusively through English.

3.2. Participants

Participation in the study was voluntary. All participants gave informed consent. Of the 95 participants, only 73 completed both the pre- and post-reading tests from the Certificate in Advanced English (CAE) (Cambridge University Press, 2025). The results from the Oxford Placement Test (Oxford University Press, 2025) indicate most students, 52%, had a C1-C2 level and that 47% had an A1-B2 level. The background data of the participants is reported in Table 1.

In addition to the student participants, four instructors participated in the study and completed pre- and post-questionnaires. The instructors had two to nine years of experience at the university level, and all had taught the course at least once before.

[1] Literature and Linguistics in this case.

[2] Common European Framework of Reference for Languages. (Council of Europe) https://www.coe.int/en/web/common-european-framework-reference-languages.

Table 1
Participant data.

Number of participants	95 (pre- and post-ARC questionnaire) 73 (pre- and post-CAE reading test)
Oxford Placement Test score	C2: 25%, C1: 33%, B2: 25%, A1-B1: 17%
Average Age	19.8 years
Gender	Female = 77, Male = 11, Non-binary = 6
Languages spoken	Average: 3.4 Spanish/Catalan/English (French, German, Galician, Chinese, Russian, Tagalog, Hindu, Arabic)
Past EAP experiences	Yes = 26, No = 68

3.3. Instruments

The following six instruments were used for data collection: the Oxford Placement Test; the four reading tasks of the CAE test; and pre- and post-ARC questionnaires for both the students and instructors.

The Oxford Placement Test (Oxford University Press, 2025) consisted of 100 questions that target grammar and vocabulary skills. The reading test was composed of four tasks (Parts 5, 6, 7 & 8) from the 2015 paper-based Practice Paper 2 of the CAE (now renamed C1 Advanced). The test included 26 questions for a total possible score of 42. The CAE reading tasks are designed to target understanding of gist, detail and text structure as well as to measure the ability to deduce meaning and recognize implicit meaning in texts (Cambridge University Press, 2025). The CAE test was the 2015 practice test two made available on the Cambridge language assessment website. The same CAE test was used for the pre- and post-test.

The students' pre-ARC questionnaire consisted of both background information questions as well as 19 targeted Likert-scale statements inquiring about perceived abilities and difficulties in LOTS, HOTS and motivation and engagement (see Appendix A). The post-ARC questionnaire for students consisted of 24 items, 18 items were Likert-scale statements, two were open-ended questions and four were multiple choice questions (see Appendix B). Students were asked about their perceptions of the ARC practice, perceived improvements in LOTS, HOTS, and motivation and engagement. More questions were included in the post-test compared to the pre-test because we added some multiple-choice questions about how students felt about the roles, and open-ended questions to ask if they would change anything about how ARC was implemented and to elicit other comments about the methodology. The Likert-scale was a five point scale with options from strongly agree to strongly disagree.

Despite having only four instructorswe chose to use questionnaires as it was the most practical way to collect the data due to the instructors' schedules. We also wanted to target specific aspects: i) perceived difficulties of AR for both students and instructors, ii) students' motivation, and, in the post-questionnaire, iii) the perceived affordances and challenges of ARC. Finally, we wanted instructors to feel comfortable to be as honest as possible, thus an anonymous questionnaire was chosen over an interview. The pre-questionnaire had 15 open-ended questions and inquired about past teaching experiences, perceptions of the challenges that students and instructors face when teaching and learning AR skills, as well as perceived participation, motivation and engagement of cohorts in previous years of the course. The post-questionnaire had 19 questions, open-ended and multiple choice, and asked about their experiences and perspectives on the ease and perceived effectiveness of the ARC methodology in learning critical reading skills and language skills, and about motivation and engagement in the class. The instructors' post-test also contained more questions than the pretest as we wanted to ask specific questions about the methodology and the specific roles. See Appendices C and D for teacher pre- and post-ARC questionnaires.

3.4. Procedure

Data collection via questionnaires and the reading tasks of the CAE test were administered on the first and fifteenth week of the course. During the course, the students completed four ARC sessions. All instructors were asked to follow the calendar in Table 2.

All tests and questionnaires were completed during class time under the supervision of the course instructor.

At the beginning of the semester, a training session was held for the instructors to familiarize them with the ARC methodology. We planned to implement five ARC sessions to give students a chance to do each role, however, due to time constraints and the amount of other content in the course; only four sessions were carried out. Two texts were on linguistics topics –one academic article and one article written for an online magazine - and two were on literature – one academic article and one book chapter. The process of carrying out the ARC was as follows.

1) Students formed groups that stayed stable throughout the course, but they had to choose different roles each time.
2) Students were assigned a text two weeks prior to the discussion.
3) Students were provided with a worksheet to complete with both at-home tasks and in-class tasks.
4) On the day of the ARC session, students came to class prepared to discuss the text with their group members and present the information/points they were responsible for according to their role (see Table 3 for details).

[3] Roles and tasks adapted from Seburn (2016).

Table 2
Study design.

Week 1	Placement test (the Oxford Placement Test) Pre-ARC Questionnaire CAE (reading tasks)
Week 2	Introduce ARC methodology and assign ARC text 1
Week 4	First ARC session in class 1.5hrs
Week 5	Assign ARC text 2
Week 7	Second ARC session in class 1.5hrs
Week 8	Assign ARC text 3
Week 10	Third ARC session in class 1.5hrs
Week 11	Assign ARC text 4
Week 13	Fourth ARC session in class 1.5hrs
Week 15	CAE (reading tasks) Post-ARC Questionnaire

Table 3
ARC roles and tasks.

Role[3]	Prepare at home	In class
Leader	Determine the aim and purpose of the text, divide the text into sections, summarize key points, create content and discussion questions.	Lead and manage group discussion, ask questions, and ensure each member participates and understands the text.
Contextualizer	Identify contextual references, select and research key references and include their significance for text understanding.	Discuss the references selected when appropriate. Explain how the additional information improves an understanding of the text. Discuss reasons why the author used those specific references. Rank the usefulness of the references.
Connector	Identify parts of the text that are unfamiliar but that relate to things that you do know. Select three points and make a connection between them and three different outside sources (readings, lectures, news, events, experiences, etc.). Write a paragraph explaining each of these connections and how it helps understand that part of the text.	Explain the connection when appropriate and how it helps understand the text better. Ask group members about their own connections. Rank the usefulness of the connections.
Highlighter	Highlight five words/phrases that directly relate to the topic of the text. Select three academic words/phrases. Highlight areas of the text that demonstrate author perspective; consider why. Make definitions of unfamiliar words.	Explain grammar, vocabulary and academic language to your group when appropriate. Discuss your definitions as a group.
Visualizer	Consider at least three areas or specific points of the text that would be useful to see visually. Create a clear visual, (an image, flow chart, graph, diagram etc.) that helps explain or support these points. Write a paragraph that describes the visual, how it connects to the text, and how it helps understand the text better.	Explain the visuals when appropriate. Rank each visual from 1 (irrelevant) to 5 Discuss the relevance of the image to understanding the text.

5) Students were asked to hand in their handout which, along with attendance at the session, was worth 1.25% of the final grade (ARC sessions formed 5% of the total grade). The activity was student-led, the professor did not intervene in the discussions but facilitated the sessions and provided support and entire class discussion at the end of the session.

3.5. Analysis

The questionnaire data was collected via Google Forms and the reading test data was collected by pen and paper tests. All data was input into an Excel sheet where it was cleaned and prepared for Jamovi (The Jamovi Project, 2023) to carry out statistical analysis. The data processing of the questionnaire followed the following procedure: firstly, 10 items from the pre-questionnaire were worded in negative terms when compared to the post questionnaire data so they were reverse scored in Jamovi. For example, the first questions in each of the following pairs of items were reverse scored:

> 'I find it difficult to understand vocabulary in academic texts'/ 'Because of ARC it was easy to understand vocabulary in academic texts'
>
> 'I feel overwhelmed when I have to read academic texts' / 'the ARC practice helped me feel less overwhelmed when reading academic texts'

After this, the items that targeted LOTS, HOTS and Motivation and Engagement were grouped together to test internal reliability of the questionnaire. The groupings were as follows. Pre-LOTS items 4, 5, 6, 12, 13 and 14. Post-LOTS items 14, 15, 16 and 8. Pre-HOTs items 7, 8, 11 and 15. Post-HOTS items 6, 7, 10, 13 and 17. Pre-Motivation items 10, 16, 17, 18 and 19. Post-Motivation items 9, 11, 18, 19, 20 and 21. See Appendix F for full details. The scores reflect an acceptable fit (ranging between .6 and .8) on Cronbach's α (Ursachi et al., 2015) as can be seen in Table 4.

After the reliability check, the means of the individual items were averaged to form a single score for each construct. Then, the data

was tested for normality, all p-values were >.05 suggesting the data was normally distributed so we proceeded to carry out paired sample t-tests on the data to detect any significant differences in the self-perceptions of LOTS, HOTS and Motivation before and after the ARC methodology. A normality check was also carried out on the pre- and post-reading data, the p-value was <.05 indicating abnormally distributed data so we chose the non-parametric Wilcoxon's signed-ranks test to detect differences from pre-to post-reading test. The Shapiro-Wilk normality test scores can be found in Table 5 (Shapiro and Wilk, 1965).

Regarding the data analysis of the open-ended questions, after reading the responses a few times, six themes emerged: 1) comments on the topics/texts; 2) comments on the instructions; 3) comments on the discussion; 4) comments on the grades; 5) comments on other students; 6) comments on the benefits. The responses were tallied, and the most relevant findings are reported at the end of the results section.

Descriptive statistics were first carried out on the data to detect trends and potential differences in the participants' perceptions and reading scores pre- and post-ARC. The results in Table 6 show that the participants tend to report a perceived improvement in both LOTS and HOTS after the ARC practice. With respect to motivation, the participants seem to feel less motivated after the ARC methodology, while reading scores improved after the ARC implementation.

To answer RQ 1 and 2 paired samples t-tests were carried out, as illustrated in Table 7.

Results show a significant difference between perceived HOTS after the ARC methodology while the difference in perceived LOTS is marginally significant. In both cases the direction is positive, meaning that the participants perceive a positive impact on these skills from the ARC methodology. With respect to motivation, the result is also marginally significant ($p = .058$) however, it is in the opposite direction, suggesting that the participants feel less motivated and engaged because of the ARC methodology. In all cases, the effect sizes are small. These results are displayed visually in Fig. 1, where the pre-column reflects the perceived difficulty level of LOTS and HOTS (0 = not difficult – 5 = very difficult), the post column reflects the perceived effect of ARC on LOTS and HOTS (0 = no effect – 5 = strong positive effect) and where motivation is reflected (0 = not motivated – 5 = very motivated).

RQ3 asked if the ARC practice had any impact on the development of students' overall reading performance. The descriptive statistics showed that there was an overall improvement in the reading score from pre-to post-ARC and, when tested statistically, the result was significant with a small effect size as illustrated in Table 7 and Fig. 2.

RQ4 inquired about the instructors' and students' perspectives on the ARC methodology, specifically for the instructors we asked about their experience implementing ARC for the first time. This qualitative data serves to give a more complete picture of the ARC implementation. Firstly, regarding challenges instructors report facing when teaching AR in the past, pre-questionnaire results show that all instructorsidentified poor entry-level reading skills (even with non-academic texts), underdeveloped critical thinking and analytical skills (HOTS), and a lack of motivation and ability to work autonomously as some of the main obstacles. Two instructors also mentioned having too much content in one course, the struggle to motivate students, and difficulty imparting the idea that learning is a process.

When asked about difficulties that students face, all four instructors perceived students as overconfident with respect to their academic skills and unable to realize that they do not understand the complexities of academic texts. They also reported that students do not recognize the value of critical reading. Specifically, instructors identified the lack of familiarity with the academic genre, length, topics, and vocabulary used, as well as little to no experience with identifying arguments and evidence as barriers to students' understanding.

Instructors reported that vocabulary and grammar are the easiest aspects of AR. All four instructors mentioned that general comprehension (LOTS) is not a problem but that connecting or applying the knowledge is challenging for students. As for past student performance in this course, on a 5-point scale, the instructors rated an average of 2/5 for engagement, comprehension, preparedness, and motivation.

The post-ARC questionnaire shows that the instructors' overall experience implementing ARC was positive and 3/4 see the usefulness of ARC for a foundational course and would like to continue to use it in the future. They all reported that the students enjoyed the methodology and felt that ARC helped students participate and ask and answer questions in class. Regarding language improvements, all four instructors felt ARC helped speaking, vocabulary, and grammar, 3/4 instructors thought that ARC helped the improvement of critical reading skills, but only 2/4 instructors noted improvements in interaction and discipline-specific knowledge. All four instructorsagreed that a main benefit of ARC is that it allows students to interact with complex texts in a low-stakes activity and that students were more engaged and motivated in class, but only 2/4 of the instructors felt that the methodology led to a deeper understanding of the text. When it comes to implementation, instructors reported that explaining the roles, carrying out the sessions, and following up were the main challenges. When asked what they would change about the ARC implementation, instructors said they would allocate a higher percentage of the course grade and more time to the activity because it requires a lot of work from both the students and instructors and that students needed a significant amount of scaffolding.

Regarding the students' perceptions of ARC, we asked open and multiple choice questions about i) the difficulty of AR in general and of ARC, ii) which roles were easy or difficult, iii) which skills they feel more confident in after ARC, and iv) what they would

Table 4
Reliability of the questionnaire.

	LOTS		HOTS		MOTIVATION	
	Pre	Post	Pre	Post	Pre	Post
Cronbach's α	.629	.778	.61	.709	.702	.796

Table 5
Normality test.

	Shapiro Wilk	*p*-value
LOTS	.987	.492
HOTS	.989	.650
Motivation	.986	.384
CAE Reading scores	.953	.009[a]

[a] Significant value.

Table 6
Descriptive statistics.

	LOTS		HOTS		MOTIVATION		READING SCORE	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
N	95	95	95	95	95	95	73	73
Mean	2.79	2.98	2.70	3.10	2.86	2.60	23.9	26.7
SD	.511	.787	.722	.770	.915	.870	7.17	8.49

Table 7
Paired samples T-test.

	Student's t	df	*p*-value	*Cohen's d*
LOTS	1.98	94	.051	.203
HOTS	3.81	94	<.001[a]	.391
Motivation	1.92	94	.058	.197
	Wilcoxon W			
CAE Reading score	730	72	.007[a]	.38

[a] Significant value.

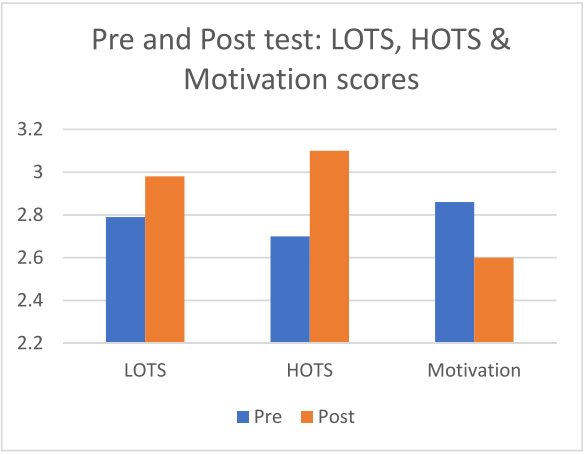

Fig. 1. LOTS, HOTS and motivation scores pre- and post-test.

change about ARC. This qualitative data contributes to a deeper understanding of the qualitative data from the teachers reported above. The results show that relatively few participants (N = 23/95) perceived reading in English as more challenging than reading in their L1, while half (N = 53/95) admitted that reading academic texts is more difficult than reading other types of texts and admitted that they do not understand everything when reading academic texts. When asked about the difficulty of ARC, 28% (N = 27/95) of the participants said it was difficult, 30% (N = 29/95) said it was easy and 40% (N = 38/95) of the participants had neutral feelings about it.

Regarding the ARC roles, participants enjoyed the highlighter (N = 35/94) and visualizer (N = 21/95) roles the most. They also found the visualizer role to be the easiest, followed by the connector. The least favorite role, and reportedly the most difficult, was the leader (N = 51/95) followed by contextualizer (N = 19/95). When asked if participating in ARC changed their confidence in language skills, students reported that analytical and reading skills improve most while working in a group, speaking and listening skills are not perceived to change much. This reflects the same trend noted in the statistical findings that HOTS (i.e. analyzing, summarizing) seem to

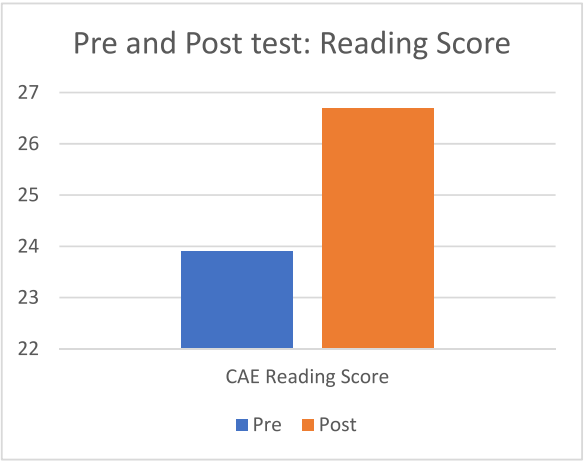

Fig. 2. Reading scores pre- and post-test.

benefit from ARC practice. However, this also shows that HOTS are difficult for students, and that they tend to dislike the roles that activate them (leader, contextualizer) preferring the roles that target LOTS (highlighter, connector).

Finally, responses to the open-ended question on what the participants would change about ARC findings showed that for the first theme, comments on the text/topic, many students would like to see shorter, easier or fewer texts used (N = 13). Others (N = 7) would like to see different topics. Regarding the instructions and distribution of work, four students would like to have clearer instructions, and nine would like the tasks to be easier. The third theme focused on discussion: four students would like to do less discussion, but more reported wanting more class discussion (N = 9). Regarding the workload to grades theme, 18 students reported wanting ARC to be worth a higher percentage of the course grade. In addition, some students commented on other students' performance; seven felt frustrated by the low-quality work of their peers. Finally, eight students felt that ARC was beneficial, while five felt that it was not. Some students left no comment.

4. Discussion

This study set out to describe the implementation of ARC in a first-year EAP course and report on i) the perceived impact of ARC methodology on LOTS and HOTS compared to participants' perceived ability in LOTS and HOTS at the beginning of the course, ii) any perceived effect of the ARC methodology on motivation and engagement, compared to perceived motivation and engagement at the beginning of the course, iii) overall improvement in reading after the ARC practice and iv) the instructors' and students' perceptions of students' AR skills and their views on the affordances and challenges of the ARC methodology.

Firstly, looking at perceived LOTS and HOTS before and after the ARC practice, we found that students started off feeling that LOTS were slightly more difficult than HOTS. At first glance this result is surprising and is in contrast with the instructors' perspectives, who note that students do not struggle with general comprehension. However, what may be happening is that students might not fully understand what HOTS entail (Bharuthram and Clarence, 2015) and they could be overestimating their abilities. In our study, despite students saying they were confident in identifying arguments, summarizing, applying, and connecting the information they read in academic texts, they reported the leader role as the most difficult, precisely the role in which they must summarize key concepts, and identify main and supporting arguments. This finding demonstrates what Railton and Watson (2005) mentioned, that there is often a serious disconnect between what faculty and students understand by critical reading. Students only seem to be able to identify LOTS and the mechanics of language (grammar and vocabulary) and are unaware of HOTS and the structure and arguments within the texts, which is what the instructors are more concerned about.

When pre- and post-scores were compared, we found that participants perceived a near significant positive impact of the ARC methodology on their LOTS, which suggests that ARC may be an effective methodology to practice LOTS in a university reading course. Moreover, the participants perceived a significant impact of ARC on their HOTS which also suggests that the ARC methodology can potentially offer positive affordances for HOTS in first year university students in similar learning contexts. This finding is in line with Cowley-Haselden (2020) who reported that students activated and maintained more HOTS with each ARC practice over a semester. The positive increase in both HOTS and LOTS scores seem to indicate that simply by participating in the ARC practice learners become more aware of HOTS and LOTS and what is involved in critical reading, which in turn helps them improve their skills.

Regarding the effect of ARC methodology on motivation, our participants did not seem to find ARC motivating or engaging and, in fact, a negative effect was noted. This finding is surprising as it contrasts with previous research such as Seburn (2016) and Marinkova and Leslie (2021) who argue that ARC has potential to motivate and engage learners, and Kang et al. (2023) who found that English medium-instruction students in Korea were positive towards ARC and that it encouraged engagement and contributed to reduced stress and nervousness over time. The open-ended questionnaire data gives us some clues regarding the interpretation of this finding. The most common complaint and suggestion for change from students was that the ARC was too time-consuming and that a higher

percentage of the course grade should be allocated to it. This deterrent seemed to overpower the potentially positive effect that the ARC might have had. This finding is also in contrast with the instructors' perspectives who reported that students seemed to enjoy the methodology and that they were more motivated than students usually are when doing traditional reading exercises. This finding aligns with what Kimberly and Thursby (2020) reported in their study, that students did not value reading and considered it a waste of time. Thus, taken together the findings point out the importance of training learners to understand the value in communicating and forming opinions, in seeing their peers as learning resources, in the process of learning and the building of knowledge and experiences in real time. Our results show that despite students noticing a significant positive impact of ARC on their reading skills, they do not value it if grades are not part of the equation. In addition to the grades, another factor that could be interfering with motivation in this study is that the course itself was demanding, with many other evaluation activities and content. The students may have felt overwhelmed with the course.

When it comes to reading outcomes, the CAE test results indicate a significant improvement in reading skills from the beginning to the end of the course. Although we cannot attribute the improvement solely to the ARC practice, it may have played a significant role. For example, this interpretation is in line with Chou's (2022) findings that ARC significantly improved reading skills, as well as the positive findings from similar methodologies involving group work and interaction in reading (Cotterall, 1990; Palincsar & Brown, 1984). Thus, it seems likely that the reading score was affected by the ARC practice. In future studies, though, a control group would be needed to confirm this finding, something that was not possible in our context as for ethical reasons we had to provide the same content to all students taking the course.

Turning to instructors and students' experiences on the implementation of the ARC methodology, we find that students do not report ARC to be especially difficult. The main complaint was an imbalance of workload to grades as mentioned earlier. In contrast to the students, instructors find ARC demanding in two ways: i) it requires a substantial time dedication when explaining the roles and, ii) The first ARC session was notably more difficult. This was also found by Le (2021), who attributed the difficulties to task management and interaction management and highlighted the need for pre-training the students to effectively carry out the discussions. This result highlights the need for significant scaffolding and time dedication for ARC to be successful in an EAP course. Apart from this, the instructors showed positive perceptions towards the methodology and many students reported enjoying ARC in the open-ended questions. This may indicate that with some adaptations to the course and context, the methodology could be an effective and enjoyable way to teach both LOTS and HOTS through AR.

5. Conclusion

Taken together, the findings suggest that ARC may be a useful and appropriate tool in university EAP courses for teaching critical reading skills, evidenced by significant overall reading score improvement and significant perceived improvements in HOTS. Instructors felt that ARC had more affordances than drawbacks. Results also show that ARC might help raise students' awareness of HOTS, LOTS and confidence with academic texts over time, something that first year students can benefit from greatly. Based on the positive trends noted in this study we encourage future research to measure LOTS and HOTS to compare with the perception data reported in this study.

This study points out the need for more studies on the effects of ARC methodology on motivation and engagement with ARC in the future. The impact of ARC on motivation seems to be closely tied to other variables such as grades and workload, and for this reason we suggest careful consideration of course contents and grading schemes when implementing ARC in a university EAP course such as this one. For example, in the future a higher percentage of the course grade should be allocated to this task and some other contents should be removed to make more space for the ARC to properly give value to the process of learning, as we feel that with the implementation of ARC "… students [would] be able to find the relevance of group discussion for themselves rather than have the justification imposed on them" (Railton & Watson, 2005, p. 187) and that it can provide instructors with a methodology that can train students to value the learning process. Finally, it should also be noted that ARC requires a significant training, planning and time dedication to be successful. Future studies are encouraged to confirm the tendencies reported in this study.

CRediT authorship contribution statement

Jennifer Rose Ament: Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Irene Tort-Cots:** Writing – review & editing, Investigation. **Elisabet Pladevall-Ballester:** Writing – review & editing, Supervision.

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Declaration of competing interest

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jeap.2025.101489.

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Jennifer Ament works as assistant professor in the Department of English and German Studies at the Universitat Autònoma de Barcelona where she teaches English for Academic Purposes, Semantics, and Pragmatics in the English studies program. Her research interests include the teaching and acquisition of pragmatics and how factors such as individual differences, language identity, ideology, attitudes, and motivations interact with language acquisition in multilingual contexts. She is a member of the funded research group GReLA (2021SGR00684).

Irene Tort Cots is an instructor in the *Early Childhood Education Degree* at Fundació del Bages-UManresa. Her research interests include teachers' beliefs, teaching and learning in plurilingual contexts and foreign language teaching and learning. She is a current collaborator of the research group GReLA (2021SGR00684) at Universitat Autònoma de Barcelona and of the research group PLURAL at Universitat de Barcelona. She teaches English for Specific Purposes at the undergraduate level of the *Early Childhood Education Degree, the Nursing Degree and the Podiatry Degree*. Also, she is a tutor and collaborator in the Universitat Oberta de Catalunya Masters program.

Elisabet Pladevall Ballester is an Associate Professor in the at Universitat Autònoma de Barcelona. Her research interests include child and adult second language acquisition in bilingual immersion contexts and foreign language learning in instructed classroom contexts. She leads the research line EFLIC (English as a Foreign Language in Instruction Contexts) within the funded research group GReLA (2021SGR00684) and teaches English Grammar and Teaching Methodology at the undergraduate level and Instructed SLA and CLIL in the department's MA program. She is also the Head of the *Departament de Filologia Anglesa i de Germanística* at the UAB.