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Research articles

Preparing health educators: the role of active teaching-learning methodologies and interprofessional education

Preparando educadores na saúde: o papel das metodologias ativas de ensino-aprendizagem e da educação interprofissional

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Abstract

This study explores the influence of active teaching-learning methodologies (ATLMs) on the training of health educators, addressing emerging curricular, technological, and interprofessional demands. An action research was conducted in ATLM courses with interprofessional classes of postgraduate students, preceptors, and professors. We collected data on participants' perceptions to evaluate the application of ATLMs in the context of interprofessional education. The key findings demonstrate that ATLMs enable more humane, dialogic, and participatory learning environments, fostering the development of critical, collaborative, and socially responsible professionals. Additionally, the appreciation for using portfolios and formative assessments stands out, allowing ongoing reflection about the educational process. In conclusion, ATLMs can transform health education and are crucial to explore strategies for improving their application in continuing and permanent education.

Keywords: higher education; health education; active learning; interprofessional education; preceptorship.

Resumo

Este estudo investiga a influência das Metodologias Ativas de Ensino e Aprendizagem (MAEAs) na formação de educadores na Saúde, abordando as novas exigências curriculares, tecnológicas e interprofissionais. Foi realizada uma pesquisa-ação em cursos de MAEAs em turmas interprofissionais, compostas por pós-graduandos, preceptores e docentes. As percepções dos participantes foram coletadas para avaliar a aplicação das MAEAs no contexto da Educação Interprofissional. Os principais resultados indicam que as MAEAs favorecem ambientes de aprendizado mais humanizados, dialógicos e participativos, contribuindo para a formação de profissionais críticos, colaborativos e socialmente responsáveis. Além disso, destaca-se a valorização do uso de portfólios e da avaliação formativa, que permitem uma reflexão contínua sobre o processo educativo. Conclui-se que a adoção das MAEAs pode transformar a educação na saúde, sendo necessário explorar formas de otimizar sua aplicação em contextos de educação continuada e permanente.

Palavras-chave: educação superior; educação em saúde; aprendizagem ativa; educação interprofissional; preceptoria.

INTRODUCTION

The rapid transformations of contemporary societies have significantly impacted professional training, especially in the health field. The need to articulate theory and practice using an integral view of human beings and an expanded concept of health and assistance is vital to ensure quality professional performance. In this scenario, educational processes are required not only to unite theory and practice, as well as academia and the healthcare network, but also to promote holistic and interdisciplinary care.

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Data availability: The data used and analyzed in this study are not publicly available to preserve the participants' anonymity and respect the ethical principles of the research. Additional data may be provided upon reasonable request to the corresponding author(s), provided that it does not compromise the secrecy and confidentiality agreed with the participants.
Study conducted at Universidade Federal de Santa Catarina (UFSC), Florianópolis, SC, Brasil.

Interprofessional education (IPE), which originated in the 1970s and was reinforced by the Declaration of Alma-Ata (1978), has been a crucial strategy in reducing professional errors and improving patient safety by stimulating collaboration among healthcare team members, consequently improving services in complex healthcare systems (World Health Organization, 2010). In Brazil, interprofessionality is a prerequisite for comprehensive and universal healthcare, incorporated into several strategic actions and reinforcing the strengthening of the Unified Health System. (SUS) (Finkler et al., 2021; Mitre et al., 2008; Peduzzi et al., 2013).

The educational practice, viewed through the lens of the ethics of cordiality by Paulo Freire (2016) and Edgar Morin (2011), requires educators to be perpetual apprentices, consistently reflecting and developing their practice. Leão (1999) states that constructivism, as a stance toward knowledge, promotes learning through the interaction between individuals and their environment, considering it a continuous and unfinished process (Becker, 1993).

Despite educational innovations, the traditional and uniprofessional model prevails in higher education in the health field, resisting the implementation of new methodologies and IPE. However, active teaching-learning methodologies (ATLMs) emerge as robust, innovative, affective, and effective alternatives in the training of healthcare professionals (Marin et al., 2010; Volpato; Dias, 2017). They provide a more reflective and critical training based on the analysis of experiences and practice, considering the life, needs, and interests of students, and preparing professionals to face technical, ethical, and political challenges in healthcare (Colares; Oliveira, 2019).

The ATLMs require critical thinking and the development of skills applicable to knowledge (Farias; Martin; Cristo, 2015), based on constructivist, collaborative, interdisciplinary, and motivating approaches. They align with the principles of Dewey (1959), Freire (1996), and Saviani (2019) by promoting transformative education to emancipate individuals and foster social commitment.

In healthcare, problem-based learning (PBL) and problematization are the most common approaches. These methodologies aim to form professionals committed to comprehensive, humanized, and interdisciplinary care in accordance with the Brazilian national curriculum guidelines (DNCs) for undergraduate courses in the health field[1], as their practical application still requires detailed curriculum development (Costa et al., 2018).

In this context, the role of educators is crucial, requiring a reflective and dialogic approach centered on the autonomy and protagonism of students, as well as curricular flexibility (Gemignani, 2012). Concomitantly, the diversity of methodological strategies enhances student engagement and performance (Bacich; Moran, 2020), combined with digital technologies that enable learning at any time and place. Moran (2007) observes that the differential in digital technology is its availability and the way creative educators apply it to inspire and motivate their students.

From this perspective, it is essential to prepare educators to work in innovative, critical, and emancipatory ways. In health care systems such as the SUS, which is understood as a professional training space/scenario, the permanent development of professors and preceptors essentially contributes to creating learning environments that challenge students to handle actual problems responsibly, creatively, and aligned with SUS demands for professionals with technical and ethical competencies and social responsibility (Ceccim; Feuerwerker, 2004; Finkler et al., 2021). Thus, it is the defense of teaching and preceptorship as essential practices to articulating theory and practice in actual care scenarios, strengthening the contextualized, critical, and interprofessional training of health workers (Ceccim; Feuerwerker, 2004).

Therefore, this study investigated the influence of ATLMs on the training of health educators. It focused on how these methodologies manage the new curricular, technological, and interprofessional requirements, considering the complexities of higher education and the health field, as well as the demands of students for stimulating and creative teaching-learning activities.

[1] The DCNs were instituted by resolutions of the Brazilian Council of Education, and they cover 14 higher education professions qualified to work in the SUS, including Biomedicine, Biology, Physical Education (Bachelor's degree), Nursing, Pharmacy, Physiotherapy, Speech Therapy, Medicine, Veterinary Medicine, Nutrition, Dentistry, Psychology, Social Work, and Occupational Therapy (Brasil, 2024).

Hence, an educational proposal[2] was designed for implementing ATLMs in an IPE context, preparing competent educators committed to training reflective and collaborative professionals capable of handling the complexities, contradictions, and challenges of the sector.

METHODOLOGICAL APPROACH

This inductive and descriptive study has a qualitative approach based on educational action research with a critical-social focus. This research type establishes a dialectical relationship between knowledge and practice, favoring the development of professors and researchers to improve teaching-learning processes (Tripp, 2005).

The study followed the basic action-investigation cycle, including five phases: 1. Planning – definition of the thematic concern, namely the qualification of the teaching-learning process using ATLMs aligned with IPE principles; 2. Implementation – method elucidation: what was done, with whom, when, where, how, and why; 3. Discussion of findings - investigation of perceptions, interpretations, and consequences of the study; 4. Evaluation – assessment of practical changes and research effectiveness; 5. Conclusion - synthesis of the achieved improvements and learnings throughout the process, including responses to the study objectives and implications for practice and future research. Figure 1 presents a schematic representation of the methodological approach used in educational action research based on the action-investigation cycle and the principles of ATLMs and IPE. The infographic colors were organized to represent the main stages of the methodological approach. Dark blue indicates the ethical-epistemological framework, which theoretically supports the study. The green color marks the steps of action-investigation development, including data collection and analysis. Yellow refers to practical implementation, including the context of courses and applied methodologies. Finally, gray represents the publicization and impact of data, with emphasis on feedback, socialization, and transformation of educational practice. The two-way arrows between the blocks show the cyclical, reflective, and interdependent nature of the investigative process.

The action research was conducted in three courses offered to optional interprofessional classes (voluntary adherence) composed of 22 master's and doctoral students of the Postgraduation Program in Public Health of the Federal University of Santa Catarina (PPGSC/UFSC) and external interested parties, 10 professors of the Multiprofessional Residency in Family Health (REMULTISF) of the mentioned university, and 21 healthcare professionals/preceptors of the State Department of Health of Santa Catarina (SES/SC), totaling 53 students. The researchers mediated the educational proposal, aided by other professors and a monitor (Chart 1). The general objective of the courses was to train health educators to apply ATLMs in the context of IPE by experimenting with educational strategies that address the planning, execution, and evaluation of the teaching and learning process.

Data on demographic and socio-professional profiles, as well as participants' experiences with ATLMs and interprofessional competencies, were collected through online questionnaires, reaching 49 respondents (92.45%). These questionnaires were sent before the start of the courses, establishing initial contact, welcoming practices, diagnostic analysis of participant profiles, and facilitating activity planning.

The primary applied methodologies were problematization, PBL, constructivist spiral, flipped classroom, and team-based learning, all of which were associated with digital and analog technologies. The activities were designed with constructivist and interactionist principles through the creation of personalized learning communities. Digital information and communication technologies were critical, as they integrated mobile learning[3] and redefined teaching practices through hybrid teaching, using instant messaging applications and collaborative platforms to facilitate communication and learning processes.

[2] This study was developed during the second postdoctoral internship of the first author (2024-2025), promoting ATLM courses for the presented action research. The findings of the investigation conducted during the first post-doctorate (2018-2020) were also considered, according to Gontijo et al. (2020).

[3] Mobile learning uses devices such as smartphones and tablets to access content and interact with professors and colleagues anywhere, offering flexibility and autonomy. This approach promotes continuous and personalized education through digital tools inside and outside the classroom.

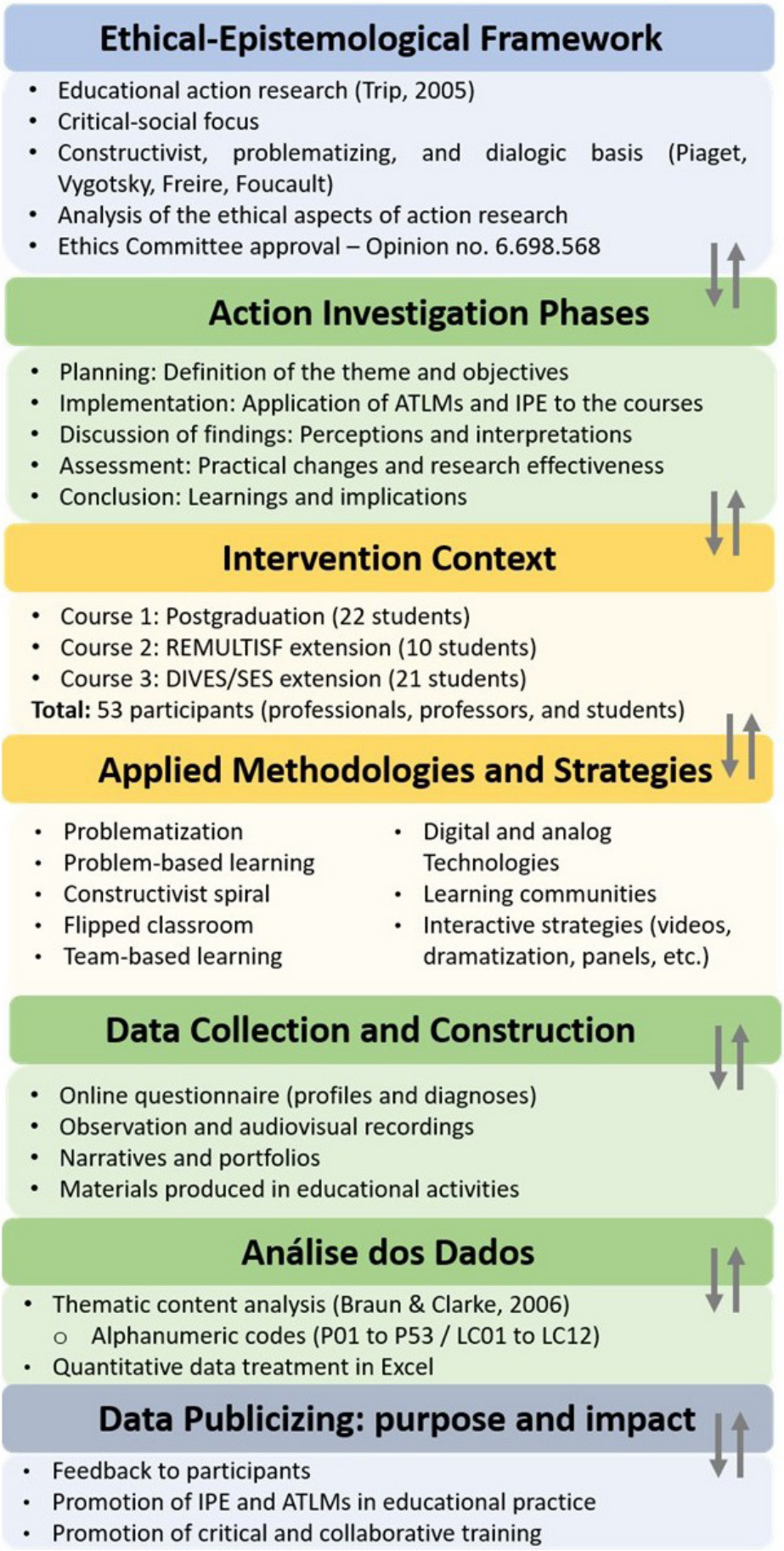

Figure 1. Scheme of the methodological approach of educational action research.
Source: The authors, 2025.

Chart 1. Details of the conducted courses.

Course	Format	Setting	Audience*	Facilitators	Students			Duration
					Male	Female	T	
1	Postgraduation subject	PPGSC/UFSC	Master's, doctorate, and external students	3 professors 1 monitor	06	16	22	60 h
2	Extension course	REMULTISF/ UFSC	Collective Health professors	3 professors 1 monitor 1 preceptor	03	07	10	20 h
3	Extension course	SES/SC	Healthcare professionals/ preceptors	2 professors 1 monitor	02	19	21	60 h
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*The three courses included healthcare professionals such as nurses (15), dental surgeons (6), physicians (6), pharmacists (5), nutritionists (5), social workers (4), biologists (4), physical education professionals (4), physiotherapists (1), psychologists (1), and, representing support healthcare professionals, one economist and one anthropologist.
Source: The authors, 2024.

The study combined in-person and distance learning modalities, with individual or group preparatory activities representing 15 to 20% of the total course load. The activities included study, research, and reflection, always based on 10 pillars that frame the pedagogical proposal used in this study: 1. Student protagonism and autonomy; 2. Interaction and learning communities; 3. Critical reflection and meaningful learning; 4. Respect for context and diversity; 5. Consideration of students' prior knowledge; 6. Development of socioemotional competencies (collaborative and affective); 7. Investigative and challenging approach centered on life; 8. Integration between theory and practice; 9. Use of digital and analog technologies and interactive resources; 10. Formative and procedural evaluation. These principles guide the construction of transformative educational experiences, aligned with the contemporary needs of healthcare training (Gontijo et al, 2019, 2020).

The educational proposal adopted a constructivist and problem-posing approach, integrating Piaget's theories on knowledge construction, Vygotsky's and Freire's emphasis on everyday knowledge, and Foucault's critique of social norms. Freire, in particular, reinforced the significance of dialogue, participation, and the cultural status of students. Based on these principles, four main factors guided the ATLMs: 1. The national curriculum guidelines; 2. A holistic conception of competence; 3. Andragogical principles[4] that value the experience and motivation of adults; 4. The ability of educators to adapt to contemporary demands, including the use of digital technologies (Gontijo et al., 2020).

Each class included an initial welcoming and connection moment, followed by dynamic educational activities with elements of movement, affection, and cognition, as proposed by Wallon (apud Mahoney; Almeida, 2011). These activities included group discussions, individual work, and learning communities, with reflective conclusions that constantly promote interaction and meaningful learning through digital technologies and collaborative tools. Hence, narratives of practices, interviews, articles, legislation, dramatizations, documentaries, short and long films, learning stations, panel construction, and museum-oriented visits, among others, were used. The participants organized the learning communities (groups of up to five students) based on affinities and interprofessionality, considering the diversity of perspectives and requiring frequent contact and cooperative work.

The data was collected or constructed through observations, narratives, activity recordings in videos and photographs, with subsequent transcription and speech analyses, as well as behavioral observations. This process was also promoted through the formative analysis of portfolios and other materials produced in various textual genres, including reviews, concept maps, reflective narratives and syntheses, drawings, schematic representations, panel constructions, and other images.

[4] The term andragogy was used instead of pedagogy in active methodology courses for adults because it focuses on teaching for this audience, considering their experiences, autonomy, and practical needs. Unlike pedagogy, which focuses on children and young people, andragogy values practical applicability and previous experience, which are key aspects of active methodologies.

The data analysis was mainly based on participants' perceptions in the formative evaluation of the teaching-learning process and the performance of facilitators-professors. A group portfolio was also used, integrating assessment and learning focused on the intellectual and moral development of participants (Hoffmann, 2014).

Thus, a thematic content analysis (Braun; Clarke, 2006) was conducted to organize and describe the dataset in detail, enabling the identification of reiterated meanings. It is a recursive process in which researchers may advance and return to phases as needed. Coding and writing begin early and continue throughout the process, following six phases: (1) Familiarization with the data through careful reading; (2) Generation of initial ideas; (3) Creation of initial codes to identify essential data elements; (4) Grouping the codes into potential themes; (5) Review and refinement of themes to generate a thematic map; (6) Production of the research report. Moreover, the participant profile data were organized in spreadsheets and considered at multiple cross-analyses with their narratives and perceptions.

To ensure the participants' anonymity and confidentiality, all identifiable data have been appropriately coded. The statements were represented by alphanumeric codes (P01 to P53) or, in the case of collective records, by learning communities (LC01 to LC12), without disclosing real names and ensuring the confidentiality of identities and protection of information related to the analyzed work processes.

The categorical variables obtained from the socio-professional, demographic, and familiarity questionnaires regarding ATLMs were synthesized in frequencies and percentages, and the data were organized in Microsoft Excel® spreadsheets.

This methodological approach aimed to ensure research robustness, educational practice transformation, and the promotion of collaborative and critical education, aligned with the guidelines of ATLMs and IPE.

RESULTS

The first group of analyzed data refers to demographic and socio-professional profiles, as well as previous participant interactions with the topics of ATLMs and IPE, which formed the contextual basis for interpreting the other results. Figure 2 summarizes the main qualitative findings of this stage to benefit accessibility and the integrated visualization of profile diversity.

Who are the students? Profiles, trajectories, and experiences

The responses of 49 participants from the three evaluated courses provided multiple trajectories, expectations, and socio-cultural conditions, with variations in the levels of teaching experience, age group, sex, ethnicity/race, economic status, and geographical proximity.

The analyzed courses presented different profiles, including young people in early postgraduate (PG) careers, individuals in training at SES, and professors with established trajectories at REMULTISF, which required adapted educational approaches. The female sex prevailed, reflecting the feminization of health professions. Black and brown people were underrepresented, highlighting the need for inclusion and racial equity policies. The heterogeneous economic conditions demanded flexibility in course formats to promote participation in unequal contexts. Geographic proximity facilitated access but required methodological and scheduling adjustments to ensure the inclusion of more distant participants, securing a dialogic educational experience committed to the principles of critical education.

Getting started: familiarity, motivations, and expectations with ATLMs

Initial participant insights presented different levels of familiarity with ATLMs, reflecting diverse formative trajectories and equally plural motivations. While the PG and SES courses concentrated on beginners seeking qualification and teaching status, REMULTISF participants already had some experience and sought to improve and redefine pedagogical practice. All courses highlighted a collective interest in enhancing knowledge and applying the methodologies to daily practice, with variable intensity according to the group profile, as systematized in Chart 2.

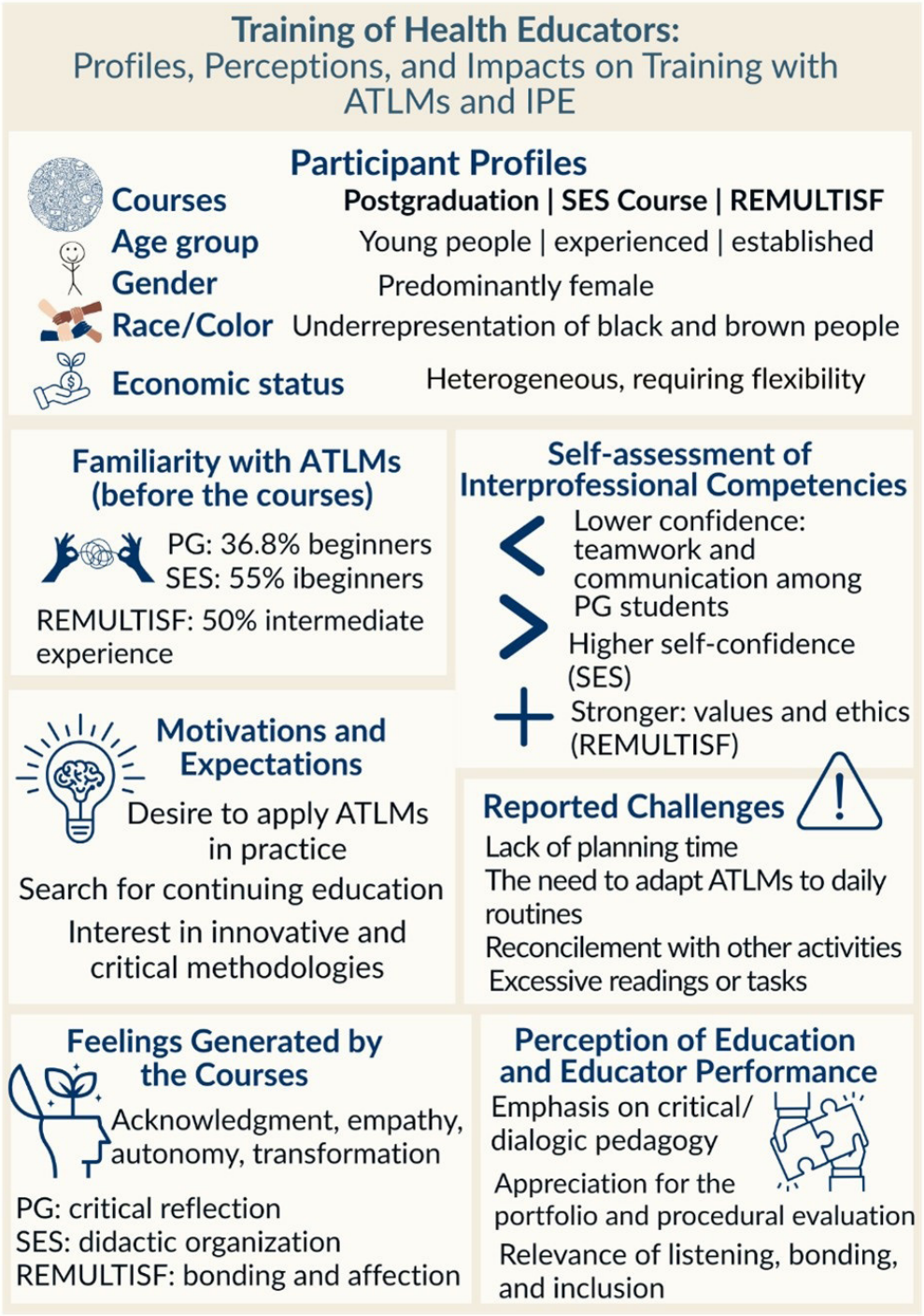

Figure 2. Training of health educators: profiles, insights, and impacts on training with ATLMs and IPE.
Source: The authors, 2025.

Despite these differences, the three groups presented a common motivation to apply ATLMs in professional practice, evidencing the relevance and timeliness of the theme. This convergence highlights the need for continuing education Such education should adapt to different learning stages, foster pathways to advanced knowledge, and be tailored to the experiences of each participant's profile. The desire for improvement was particularly striking among REMULTISF professors, demonstrating that even the most experienced professionals recognize the need for updating and the critical qualification of pedagogical practice. The verified heterogeneity reinforces the relevance of personalized and dialogic educational proposals that trigger significant reflections from the initial contact to the redefinition of methodologies in daily professional life.

Chart 2. Level of familiarity, motivation, and interest in enhancing the knowledge of ATLMs among participants of the three courses.

Course	Previous familiarity with ATLMs	Stated motivation	Interest in enhanced knowledge
PG	36.8% beginners 31.6% never used them	Academic qualification and initial teaching status	47.4% want to apply and seek basic training
SES	55% beginners	Methodological innovation and continuing education	Most want to apply in daily practice
REMULTISF	50% intermediate experience	Pedagogical improvement; already used them partially	Strong interest in enhancing knowledge and redefining practice

Source: The authors, 2025.

Findings and challenges along the way: competencies, affections, and obstacles

The self-assessment of interprofessional competencies[5], based on the guidelines of the Interprofessional Education Collaborative (2023), indicated a positive participant perception, with emphasis on the "Values and Ethics" domain, which was evaluated as the most solid among the groups. The other skills presented room for improvement, especially among postgraduate students. The SES preceptors demonstrated higher self-confidence. REMULTISF professors ranked themselves as intermediates, evidencing the role of practical experience in this evaluation process.

This balance between total and partial agreement in the other responses reveals that, although the participants recognize room for improvement, they have a positive self-image, especially in the ethical field, whose nature is more intangible. This self-assessment covered four areas: (1) Values and ethics, (2) Roles and responsibilities, (3) Communication, and (4) Teamwork. The following chart highlights the results by area and group (Chart 3).

Chart 3. Self-assessment of interprofessional competencies reported by course participants.

Interprofessional competencies	General assessment	Group with higher self-confidence	Group with lower confidence
1. Values and Ethics	61.2% total agreement	REMULTISF	-
2. Roles and Responsibilities	Positive evaluation with room for improvement	SES	PG
3. Communication	Balanced full and partial agreement	SES	PG
4. Teamwork	Prevalent partial agreement	SES	PG

Source: The authors, 2025.

Feelings of recognition, empathy, autonomy, and transformation marked the formative experience, with different emphases among the courses: bonding and critical reflection among postgraduate students, organization and application of ATLMs among SES professionals, and affection and communication among REMULTISF professors. Transversely, the reports showed the participants' commitment to a more human, reflective, and transformative formation (Figure 3).

Task overload, technological mediation, reduced planning time, and difficulty in offering constructive feedback stood out among the main reported challenges. The groups also presented specific obstacles: postgraduate students sought to break with traditional models and develop more autonomy, SES professionals faced the challenge of making complex content more accessible, and REMULTISF professors handled structural difficulties and school dropout (Figure 4).

[5] *Values and Ethics* competence - working with team members to maintain a climate of shared values, ethical conduct, and mutual respect. *Roles and Responsibilities* competence - using the knowledge of one's role and the experience of team members to address individuals and the population to achieve health outcomes. *Communication* competence – communicating responsively, responsibly, respectfully, and in a supportive manner with team members. *Team and Teamwork* competence - using the knowledge of one's role and the experience of team members to address individuals and the population to achieve health outcomes.

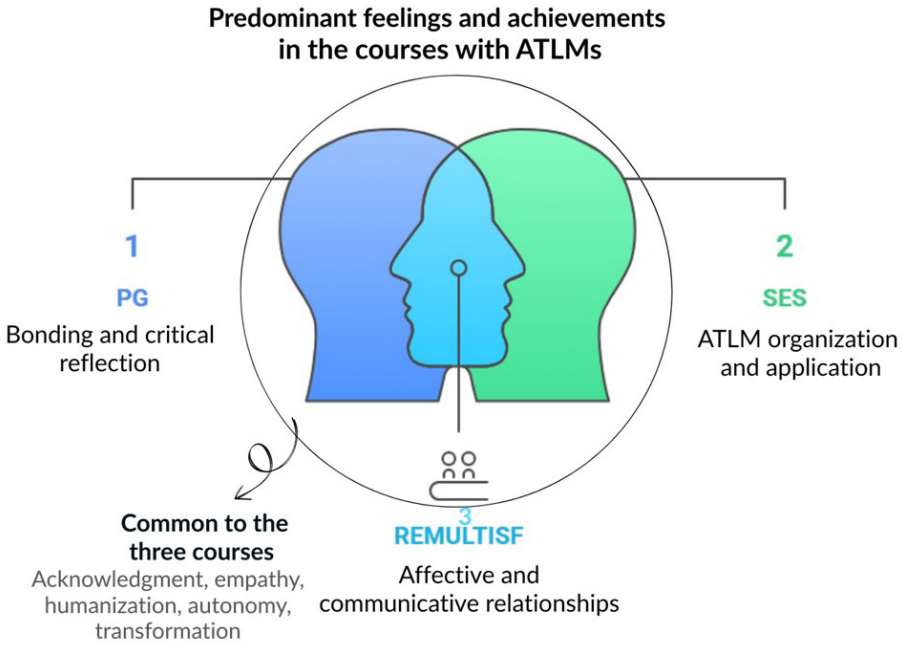

Figure 3. Predominant feelings and achievements in the courses.
Source: The authors, 2025.

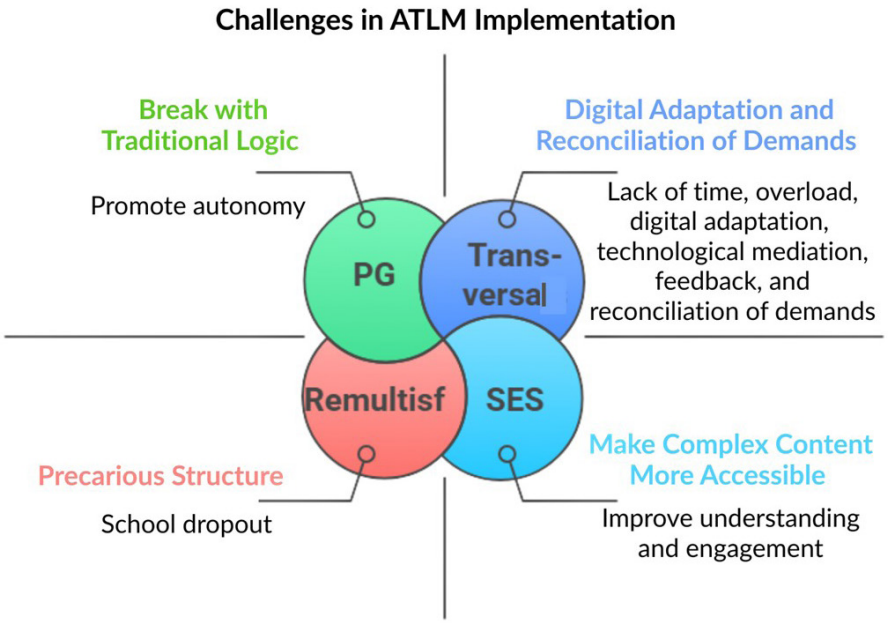

Figure 4. Challenges in ATLM implementation.
Source: The authors, 2025.

What did they say about the experience? Perceptions about facilitators and the process

The last line of the result analyses revealed powerful perceptions about the teaching-learning process experienced in the courses and the performance of facilitators-professors. Participant manifestations, organized into thematic categories (Chart 4), indicated significant contributions of ATLMs in promoting autonomy, faculty leadership, and educational transformation. The aforementioned chart was based on the thematic analysis of participants' narratives, organizing the speeches into central categories and subcategories that express perceptions about the pedagogical approach, formative impacts, bonding with the facilitators, and facing challenges. The selected speeches were representative and analytically relevant to synthesizing the main qualitative findings in an accessible and interpretative way.

Chart 4. Thematic categories and representative speeches about the experience in courses with ATLMs.

Thematic category	Subcategory/Focus	Examples of participant speeches
Pedagogical approach	Critical and dialogic education; rupture with banking education	"The change from the traditional evaluation to a procedural evaluation motivated higher commitment." (P01)
	Dynamism and active listening	"The participatory dynamics brought a new teaching perspective, promoting engagement and self-confidence." (P02)
	Formative methods and meaning	"Formative methods based on affection and meaning production learned in the Collective Health education." (P05)
Formative impacts	Transformation of teaching practice	"A validating and strengthening environment, promoting collective learning and transforming teaching practice." (P04)
	Toolbox expansion	"My toolbox has been expanded with knowledge and confidence." (P06)
	Protagonism and belonging	"Engaging and bonding foster an active, dialogic, and committed formative process, with yourself and others." (P07)
	Broad educational horizons	"The course was described as 'broad horizons,' with the potential for application at different healthcare training levels." (P09)
		"The course broadened my horizons, and I intend to use the acquired knowledge in undergraduate studies, residency, and the professional master's degree in Family Health." (P12)
	Transformative and inclusive education	"A transformative education is based on pillars that promote meaningful learning and an inclusive environment, ensuring equity, respect, collaboration, creativity, and critical thinking. This plural education values listening and celebrates differences, uniting ethical and political aspects with affection and sharing. Even simple moments, such as the coffee break, can be learning tools. When discussing education, we should focus on what it is instead of what it is not." (LC01)
Student-facilitator relationship	Welcoming and affective bond	"The course is being developed with great dedication, affection, and care by the facilitators. At each meeting, they share knowledge and emotion with us." (P11)
	Affection in the teaching-learning process	"Preparation, care, and affection are important to trigger learning-teaching processes." (P10)
	Integration and security	"The learning community was a safe space for the exchanges." (P03)
Challenges experienced	Overload, time, and content complexity	"The course has been a challenge for me. I don't feel comfortable expressing my opinions. At times, I found the volume of activities and information high. However, facilitators make learning light with their good conduct." (P08)
	Adaptation to the new method	"I cannot dedicate myself as much as I would like to the proposed activities." (P13)

Source: The authors, 2025.

The pedagogical approach was widely appreciated for its solid identification with Paulo Freire's critical pedagogy, especially for breaking with the banking education logic and promoting problem-posing and dialogic practices centered on the production of meaning (P01, P02, P05, LC01). ATLMs were recognized for their impact on promoting critical thinking, learners' autonomy, and building a welcoming and transformative learning environment.

The courses were described as dynamic, affective, and participatory training spaces, which expanded methodological repertoires (P04, P06, P07, P09) and enabled the revisit of authors and transformative educational practices. Using the portfolio as a procedural and self-reflective assessment tool was repeatedly praised (P12).

The relationships between students and facilitators were highlighted by active listening, care, and affective sensitivity, favoring a safe, horizontal, and inclusive environment (P03, P10, P11). The relevance of welcoming practices as a pedagogical strategy and the creation of supportive learning communities was explicitly acknowledged, as interprofessional exchanges strengthened bonds and educational practices committed to equity and dialogue.

The primary reported challenges included activity overload, time management, and adaptation to new pedagogical methods (P08, P13). These issues were the subject of suggestions by the students and generated procedural modifications, such as scheduling adjustments and the reorganization of reading tasks. Despite the difficulties, the courses were considered formative milestones that triggered significant changes in teaching practices, as well as ways of thinking and performing health education.

The three classes presented consistent evaluations, with emphasis on the pedagogical power of ATLMs, the role of facilitators, and the relevance of experiences, reinforcing the centrality of critical, affective, and transformative training as a basis for more fair, inclusive, and emancipatory educational processes.

DISCUSSION

This research reinforces relevant literature findings on the feminization of health professions and the persistent underrepresentation of black people in these contexts, underscoring the urgency of educational policies aimed at inclusion and racial equity. The diversity of participant profiles, considering sex, race, age group, experience, and socioeconomic status, revealed the complexity of training demands in the health field, requiring a flexible pedagogical approach capable of articulating the different life and work trajectories. In this scenario, the inseparability of teaching, research, and extension, which Freire (1996) defended by stating that "there is no teaching without research and research without teaching," constitutes a fundamental principle for truly inclusive and transformative educational practices.

Despite the participants' heterogeneous familiarity with ATLMs, the critical data analysis demonstrates a common and significant motivation to enhance knowledge and apply it in practice. This disposition indicates a strong demand for continuing education, which evidences the relevance of customizing andragogical approaches to meet different experience levels, from the initial introduction to advanced refinement. This perspective is articulated by authors who recognize continuing education as essential for customizing ATLMs, enabling higher adaptation to educational realities and the diversity of students' experiences (Ferreira; Morosini, 2019; Kenski, 2012; Silva, 2022).

In this sense, methodological flexibility and the strategic use of digital technologies emerge as indispensable tools for expanding access, participation, and involvement of healthcare professionals in training processes. As Imbernón (2000, p. 85) observes, "[...] the school must open its doors and tear down its walls not only to let in what happens beyond its boundaries, but also to mingle with the community to which it belongs". The formative proposal analyzed in this study exemplifies this openness by articulating theory, practice, social context, and active listening practice.

The assessment of interprofessional competencies, highlighting values, ethics, and teamwork, revealed significant reinforcement among participants. Socio-emotional competencies, such as empathy, solidarity, and cooperation, were central to the IPE experience and enhanced by the integration with ATLMs, such as PBL and hybrid education (Cavalcanti, 2023; Silva et al., 2015). By providing actual problem-solving, critical reflection, and collaborative learning, these methodologies form professionals who are prepared to work in complex, ethical, and user-centered contexts.

However, the educational approach also revealed significant challenges, especially regarding the search for innovation in andragogical practices and the need for resources and time to plan, implement, and evaluate active learning strategies. The use of mobile devices, for instance, aligns with the profile of contemporary students (Martins; Schnetzler, 2018), but requires adaptation by educators. Bergmann et al. (2019) highlight that transitioning into digital represents not only a technological change, but a profound methodological transformation aimed at building a more open, collaborative, and formative education for autonomous and critical citizens.

In this approach, using the portfolio as an instrument for procedural and reflective evaluation stood out as an effective strategy to customize learning and strengthen the role of students (Gontijo et al., 2020). All analyzed courses acknowledged this resource, reflecting a broader understanding of evaluation as a formative element instead of a summative aspect.

Moreover, the courses were widely recognized as spaces of self-awareness, collective construction, and knowledge exchange, in which active methodologies were experienced in practice and associated with listening, affection, and appreciation of individual experiences. Imbernón (2000) addresses the need to break with the monopoly of knowledge and constitute actual learning communities in formative contexts. Testimonials from participants indicated that even informal moments, such as coffee breaks, were redefined as pedagogical opportunities, promoting more plural, inclusive, and ethical education.

The leadership of students, the lightness in conducting classes, and the recognition of facilitator mediation were widely valued in course evaluations. This sensitive and creative mediation contributed to a safe, engaging, and transformative learning environment, which enabled the reassessment of traditional practices and the construction of new teaching-learning processes. The reported experiences demonstrate that participants were encouraged to step outside their comfort zones, adopt new perspectives, and develop their formative practices based on ethical values, social commitment, and criticality.

Additionally, the course was described as significant in personal and professional aspects, promoting dialogic education and strengthening trust in the relationships between educators and students. The ATLMs were deemed powerful transformation tools for the format and content of the training process, allowing students to actively construct knowledge and promote changes in educational and healthcare realities.

However, limitations related to time management, the volume of activities, and the clarity of instructions were also indicated at times. Such issues underscore the need to adjust the pace and format of activities, especially when intending to reconcile continuing education with professional and personal commitments. Masetto (2004) emphasizes that, in the information society, educators face the challenge of managing excess data, which may generate a sense of impotence and dispersion, requiring focus, reflection, and careful planning.

The reflections on the courses suggest the centrality of humanized learning environments, guided by Paulo Freire's critical pedagogy, as opposed to the traditional education logic. The proposed education was dialogic, integrative, and aimed at individual emancipation. Using ATLMs in this context was not limited to a single technique, but incorporated as the expression of an ethical and political commitment to form reflective and socially committed professionals.

The convergence among the courses regarding the appreciation of innovative practices, the performance of facilitators, and the portfolio methodology shows the robustness of the proposal and its ability to adapt to different audiences and contexts. Formative experiences successfully united theory and practice, while embracing subjectivities and participant trajectories, favoring their critical and collaborative insertion into healthcare.

Finally, this study discusses analyses of innovation in higher education as a process that extrapolates the use of new technologies and requires structural changes in teaching-learning models (Bacich; Moran, 2020; Masetto, 2004). This transformation addresses educational foundations to academic management modes, requiring more democratic and collaborative spaces centered on care, listening, and shared responsibility.

Thus, the potential of ATLMs and IPE to consolidate education that is critical, emancipatory, and deeply connected to the social and professional realities of health educators is reaffirmed. More than teaching techniques, it is about constructing meaning, bonds, and ethical prospects that help develop individuals capable of actually transforming their practices and communities.

FINAL CONSIDERATIONS

The study highlighted essential elements for innovation in educator training in higher education, focusing on critical, reflective, and committed professionals. The ATLMs corroborated Paulo Freire's critical pedagogy, benefiting the training of health educators and promoting a humanized and participatory learning environment focused on students' autonomy and reflection. Using the portfolio and formative evaluation was appreciated for allowing continuous assessment and strengthening the relationships between educators and students. Challenges related to time management and volume of activities were mentioned, with suggestions for more flexibility. The study indicates that ATLMs can transform health education by promoting more inclusive and collaborative educational approaches. Future studies may explore ways to optimize the application of these methodologies, especially in continuing, permanent, and interprofessional education.

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Authors contribution
LPTG and MF: Contributed jointly in all research stages, including study conceptualization, methodology design, data curation, and formal analysis. They worked collaboratively in the investigation and collection of information, project administration, and the provision of necessary resources. They were also responsible for preparing the visuals of results through charts and graphs. Finally, they wrote the original manuscript, performed its critical review and editing, and jointly approved the final version submitted for publication.

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