

E-TUTORING IN HIGHER EDUCATION: TRADITIONAL FUNCTIONS AND CHALLENGES IN THE ERA OF GENERATIVE AI. A NARRATIVE LITERATURE REVIEW

E-TUTORING NELL'ISTRUZIONE SUPERIORE: FUNZIONI TRADIZIONALI E SFIDE NELL'ERA DELL'IA GENERATIVA. UNA REVISIONE NARRATIVA DELLA LETTERATURA



Double Blind Peer Review

Citazione

Selmi S., Sorrentino C., & Martiniello L. (2024). E-tutoring in higher education: traditional functions and challenges in the era of generative AI. A narrative literature review. *Giornale Italiano di Educazione alla Salute, Sport e Didattica Inclusiva*, 8(2), Edizioni Universitarie Romane.

Doi:

<https://doi.org/10.32043/gsd.v8i2.1200>

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gsdjournal.it

ISSN: 2532-3296

ISBN 978-88-7730-493-3

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ABSTRACT

Over the past twenty years, online tutoring models, considered strategic and essential in distance university education paths, have adapted both to the introduction of innovative digital technologies and to emerging new learning modalities. This article aims to provide a narrative literature review, starting from Salmon's seminal text, focusing on the evolution of e-tutoring in a university learning context, to identifying new areas of study and exploration.

Nel corso degli ultimi vent'anni i modelli di tutoraggio online, ritenuti strategici ed essenziali nei percorsi di formazione universitaria a distanza, si sono adattati sia rispetto all'introduzione delle tecnologie digitali innovative, sia in relazione a nuove modalità di apprendimento che vanno affermandosi. L'articolo intende restituire una revisione narrativa della letteratura che, a partire dal testo fondamentale di Salmon del 2000, focalizzi l'evoluzione dell'e-tutoring in un contesto di apprendimento universitario, con l'intento di individuare nuove aree di studio e approfondimento.

KEYWORDS

e-tutoring, higher education, ITS, literature review.

e-tutoring, formazione universitaria, ITS, revisione della letteratura.

Received 23/05/2024

Accepted 11/06/2024

Published 24/06/2024

Introduction

Since the beginning of the century, the development of e-learning has been exponential; similarly, the demand for distance learning in higher education has steadily grown; disruptive events like the pandemic and the development of generative artificial intelligence have opened new challenges in the educational field. In online learning processes, tutoring practices have proven to be strategic and essential in distance learning contexts. Significant contributions to the analysis of e-tutoring and e-tivities have been provided by Gilly Salmon [Salmon 2001,2002]: the *Five Stage Model* remains a reference point both for practical teaching activities and for theoretical reflection and the development of integrative models. Similarly, Garrison et al. [1999] have demonstrated through their studies how necessary it is to ensure *forms of presence* that counteract the sense of isolation, even in distance learning. E-tutoring, therefore, constitutes a fundamental support for learning, balancing the limits of self-learning and reducing the risks of dropout. A growing interest has also been shown in Italy, with significant studies by Rotta & Ranieri [2005] and Rivoltella [2006], who proposed a cyclical model of the main functions of online tutoring.

Over the past two decades, forms of tutoring have spread and expanded; in the same way, scientific studies in the field have multiplied, developing a wide range of proposals for enriching and expanding the Salmon model, also thanks to the availability of a growing amount of data. This article intends to offer a narrative review of the literature, conducted according to a consolidated methodology [Ghirotto 2020], to understand whether the traditional functions of online tutoring have changed and how. A partial but reasoned assessment of the "state of the art" may help identify the main open research questions and some perspectives for future studies.

1. Theoretical Foundations

E-tutoring encompasses multiple practices and activities aimed at supporting the unique needs of students engaged in digital and distance education. These activities vary depending on the context in which they are implemented: the age of the students, the type of courses offered (whether formal or informal, online or blended, refresher or professionalizing courses), and the geographical and cultural area; moreover, the tutoring functions can vary according to the methodological-didactic models adopted by the providers. In any case, e-tutoring aims to facilitate

the experience of students at risk of isolation and who require guidance, advice, and orientation during their educational journey.

Theoretical reflections on e-tutoring in a university context intensified at the end of the last century and found an effective synthesis in the model proposed by Professor Gilly Salmon, which is still used today and considered valid [Rivoltella 2021]. The *Five Stage Model* (Fig. 1) was first introduced in the book *E-moderating: the key to teaching and learning online* [Salmon 2001] as a result of Salmon's decade-long experience at the Open University: it proposes a division into five stages that can be applied to a generic online university course, and each stage corresponds to specific functions of e-moderating. The first stage corresponds to a primarily technological function (help desk) aimed at resolving problems and questions about the use of the platform, learning environments, and tools (Access and motivation). The second stage corresponds to a social function (Online socialisation) aimed at facilitating acquaintance among students and triggering group dynamics. The third stage corresponds to facilitating access to information on the use of materials, time management, and e-tivities (Information exchange). The fourth stage corresponds to a conceptual and pedagogical function aimed at facilitating the learning process (Knowledge construction). The fifth stage corresponds to a function of supporting the autonomous development of the student community (Development).

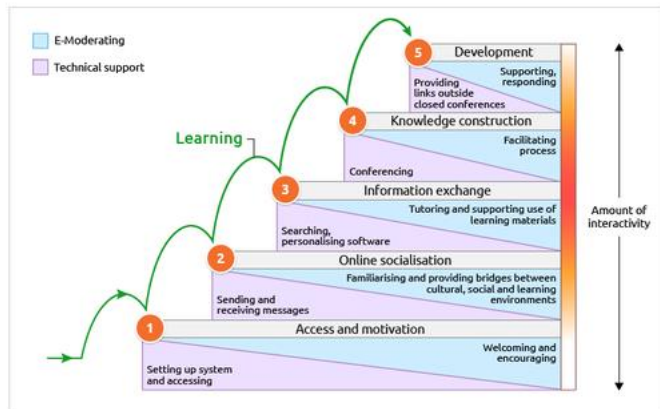


Figure 1 (Five Stage Model, Salmon 2002)

The importance of the community dimension in university distance learning courses was emphasized in the same years by scholars at the University of Alberta in Canada: the model proposed by Garrison et al. (Fig. 2) offers a synthesis of some elements necessary for meaningful and deep learning: cognitive presence, teaching presence, social presence.



Figure 2 (Community of Inquiry Model, Garrison et al., 2000)

In Italy Rotta & Ranieri [2005] have emphasized the importance of *pedagogical presence* online, defined as the mediation of learning and socialization processes, aimed at countering *symbolic absence*, that is, the lack of mediation, relationship, and dialogue among students and between students and instructors [Jacquinet 2002, Collison et al 2000]. At the same time, regarding the functions of e-tutoring, the theoretical contribution of Berge [1975] and the revisions proposed by a transnational study group from the Universities of Liège and Lancaster, Denis et al. [2004], are referenced: to the structured schema based on 7 central roles and 5 peripheral roles (Table 1), the Italian scholars have suggested adding 3 more (Table 2).

Central Roles	
1	Content facilitator: the e-tutor intervenes sometimes as subject expert, sometimes as interpreter and guide through the concepts of study...
2	Metacognition facilitator: he/she supports reflection on learning activities and outcomes, study skills development...
3	Process facilitator: he/she supports learners' learning strategies, time management...
4	Advisor/Counsellor: he/she provides pastoral support, doorway to institutional/local support systems

5	Assessor (formative and summative): he/she gives feedback on task achievement and performance, assignment development, sometimes he/she is also an examiner...
6	Technologist: he/she is a guide, first-post support with technologies and tools for learning...
7	Resource provider: he/she identifies and locates, develops and produces resources to provide 'just in case' or 'just in time' learning support.
Peripheral Roles	
8	Manager/Administrator: the e-tutor supports the management of the course keeping records, checking the enrollments, ...
9	Designer: he/she can sometimes intervene to help to design the course or course module, the 'lesson' itself – the pedagogies, the tasks to be done
10	Co-learner: often, the role of the e-tutor is not 'stage on the stage' or even 'guide on the side', but genuinely 'friend to the end' of the course, walking with the learner participants and learning alongside them
11	Researcher: he/she can be a reflective practitioner and action researcher from his/her e-tutor experience

Table 1 (E-tutors Roles Model, Denis et al. 2004)

1	Community facilitator: intervenes to indirectly stimulate and support collaborative groups or communities of practice that operate in relative autonomy.
2	Coach/master: intervenes to train coordinators of collaborative groups and to facilitate ongoing dynamics in groups through simulations, role-playing, and team-building activities.
3	Mentor/trainer: encourages forms of consolidation of experience, supports through online spaces for sharing and discussion the transition between the learning process and the impacts of the course, promoting the maintenance of relationships between former students/participants.

Table 2 (E-tutors Roles Model Integretion, Rotta & Ranieri 2005)

Finally, the model developed by Rivoltella [2006] regard the cycle of e-tutoring functions: it shows how the roles assumed by tutors change in intensity and importance during an online class, from its start date to its conclusion. The functions identified by Rivoltella are grouped into 5 major areas: technological, social, conceptual/pedagogical, organizational/structural, and evaluative. While the technological function decreases as the course progresses, the conceptual function, conversely, gains importance. The organizational and social functions lose intensity but remain significant, whereas the evaluative function accompanies the entire course duration (Fig. 3).

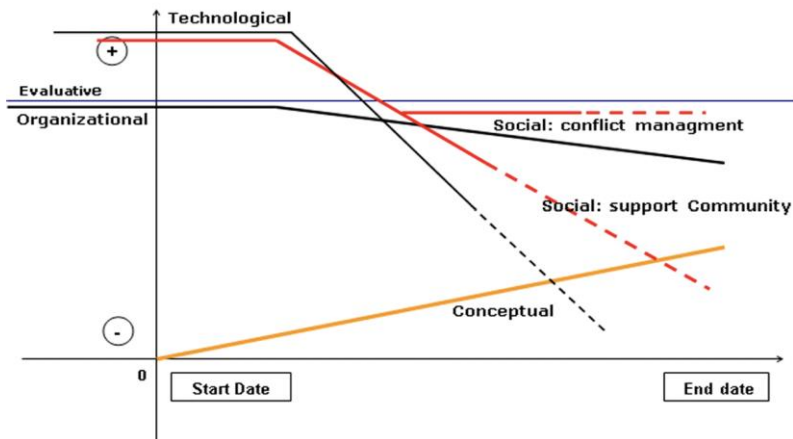


Figure 3 (Cycle of Tutor functions Model, Rivoltella 2006)

The validity of the model of the cycle of functions has recently been confirmed by the studies of Ferrari & Triacca [2021] concerning both blended and online courses, though less so for MOOCs. Thus, a reflection is proposed regarding ongoing changes, both in terms of the emergence of 'community technologies' and the transformation of 'learning communities', as well as the development of increasingly efficient Intelligent Tutoring Systems (ITS). The increasing demand for distance education, often in the form of self-learning, coupled with investments in AI applications to teaching environments and strategies, prompts an examination of possible future scenarios.

2. Method

In line with the above considerations, we decided to conduct a review of the international literature to verify whether and how the representation of the functions of e-tutoring has changed from the beginning of the century to today. A narrative review was chosen to “familiarize with the relevant research in the reference field and to identify critical issues and gaps in the literature” [Ghirotto 2020], laying the groundwork for a potential future systematic review to be conducted on more precise themes and defining the time frame of the publications to consider. The questions guiding the research are as follows:

RQ1: Have the traditional functions of online tutoring in a university context evolved over the last 25 years?

RQ2: What prospects open up for future studies?

Our research strategy involved several phases:

1. The first step in our research strategy was mapping emerging concepts from the reference literature establishing the basic theoretical foundations of this research field. This was useful both for defining the search string and for comparison during the analysis proper.
2. The second step was the selection of databases for conducting the research. We chose to use WoS, Scopus, and Eric for their comprehensive coverage and relevance to our research topic.
3. The third step was the definition of the search string, using Boolean operators: "E-tutor*" OR "E-moderator*" AND "Higher education" OR "University".
4. The fourth step was the definition of inclusion and exclusion criteria to be applied in database research. The inclusion criteria adopted were as follows: paper
 - from the year 2000 to 2024
 - in English
 - peer-reviewed
 - available in open access

The paper selection process emerging from the search followed these steps:

1. Creation of a dataset including author, title, keywords, and year of publication.
2. Removal of duplicates.
3. Exclusion of non-relevant contributions based on the reading of titles and nearly all abstracts. At this stage, contributions that had no relevance to e-tutoring functions and the university context were excluded.
4. Integration of contributions based on the bibliography present in the included papers.
5. Enrichment of the dataset with information on the type of study, author affiliations, and the significance of the contribution relative to the research

questions. We report the numerical results of the selection process through a simplified revision of the Prisma flowchart (Fig. 4).

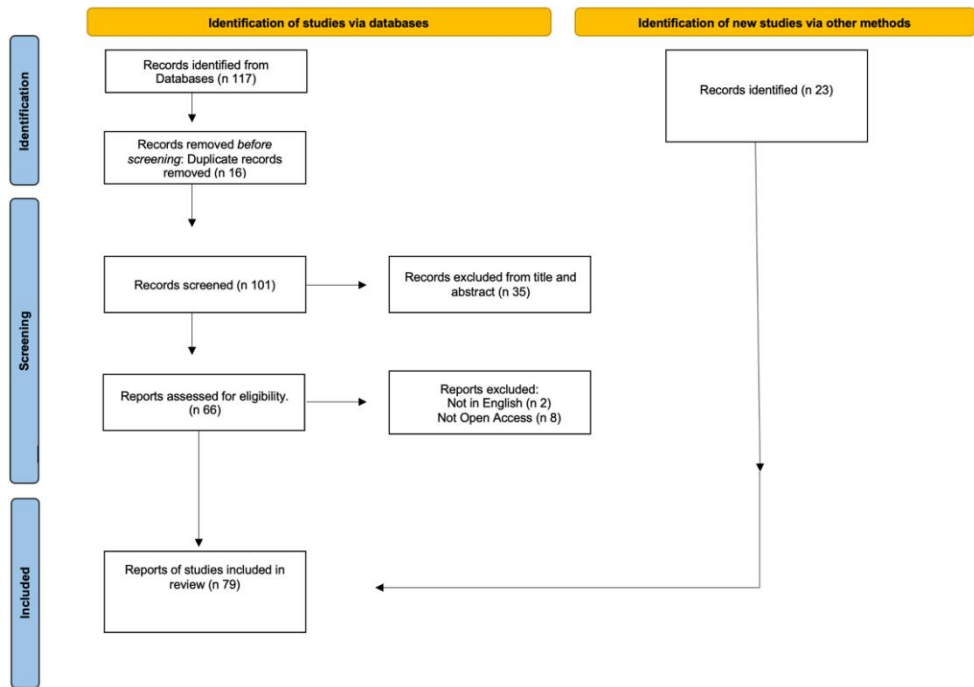


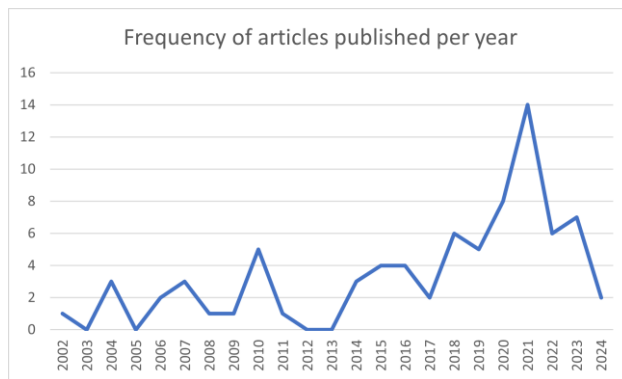
Figure 4 (Prisma Flowchart)

From the database research, 117 studies emerged; 16 duplicates were removed; another 45 contributions were excluded based on the exclusion criteria (35 for not being relevant to the research questions, 10 because they were not available in English and open access). To the 66 selected studies, an additional 23 significant contributions meeting the inclusion criteria were added. In total, 79 papers were reviewed.

3. Results

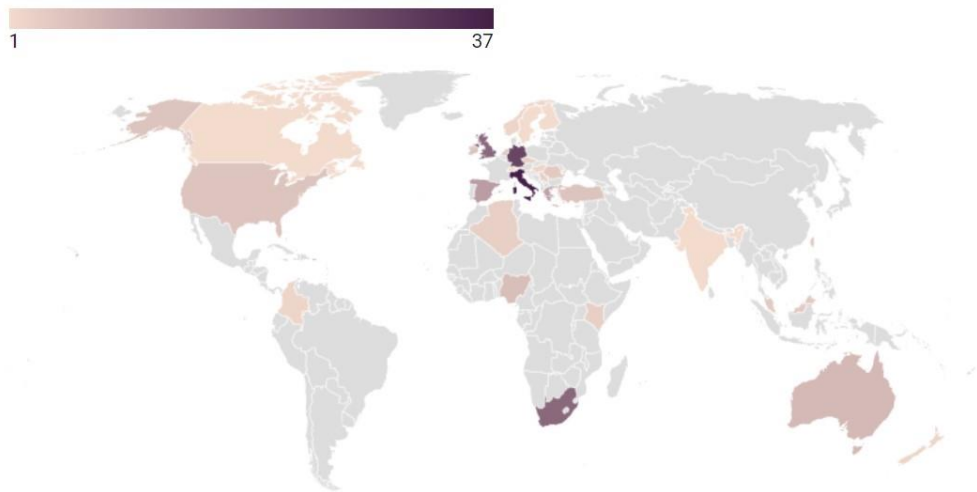
The studies analyzed here cover a wide range of typologies. The recurring methodology employed is qualitative and includes semi-structured or open interviews (written or oral), focus groups, and case studies through observation and description of interventions (both synchronous and asynchronous) in forum groups

and video recordings of interactions between students and e-tutors. Among the quantitative analyses, we find studies conducted using closed-ended and multiple-choice questionnaires; statistical regression analyses are often applied to some set of indicators extrapolated from the collected data. Besides, papers reporting the research results of inquiries based on mixed methods of analysis, there are theoretical contributions proposing frameworks for e-tutor competencies and roles and for updating traditional models. Finally, some papers are practical/descriptive: proposed materials created by e-tutors, training courses, and practices of virtual monitoring. Four papers are dedicated to systematic literature reviews [Copacia & Rusub 2015, Langese 2023, Mauro 2023, Ahlf & McNeil 2023]; a scoping review supplements these [Kibuku et al. 2020]; almost all of the papers, moreover, present detailed reviews in this area of research in their introductory sections.



Graph. 1 (Frequency of articles per year)

Publications peaked in 2021, partly due to the COVID-19 pandemic and the introduction of remote courses by universities that had not previously offered them (Graph. 1). Geographically, the studies considered here cover all continents; however, an explicit limitation of the research, which included only English written materials, is the lack of literature from Latin America and Francophone countries (Graph. 2). Most publications come from universities located in South Africa, and Europe, especially UK, Germany, and Italy.



Graph.2 (Authors Affiliation)

4. Discussion

This review reveals many critical issues and relevant aspects regarding online tutoring practices. Overall, the latter are confirmed as crucial supports in online and distance learning. Traditional models proposed at the beginning of the century have retained their validity, remaining essential reference points for professional figures involved in e-moderating activities. The importance of the first four functions described in the *Five Stage Model* (fig.1) is confirmed in many studies [Giguere 2009, Kumar 2010, Pineda & Tamajo 2016, Vasodavan et al. 2020]. References to Garrison's theoretical framework on *presence* are explicit in contributions from universities in Australia and South Africa [Maré & Mutezo 2021, Payne 2021, Enwereji et al. 2023], particularly concerning the effectiveness of the conceptual and pedagogical function. The detailed distribution of roles devised by Denis has been revisited in many researches investigating the relationship between skills and competencies required to e-tutors and their perception on their part [De Metz 2018, Raviolo et al. 2021, Ferrari & Triacca 2021, Ferrari et al. 2021, Raviolo et al. 2023].

Research into functions, in fact, often intersects with that into the e-tutors' identity and into the skills required of them. In this regard, syntheses [Goold et al. 2010] and integration frameworks have been proposed to highlight the dynamism of the organizational/managerial function of e-tutors [Vlachopoulos & Cowan 2010];

interventions and proposed activities must be tailored and personalized based on the interactions established from time to time with students (Fig. 5 and 6)

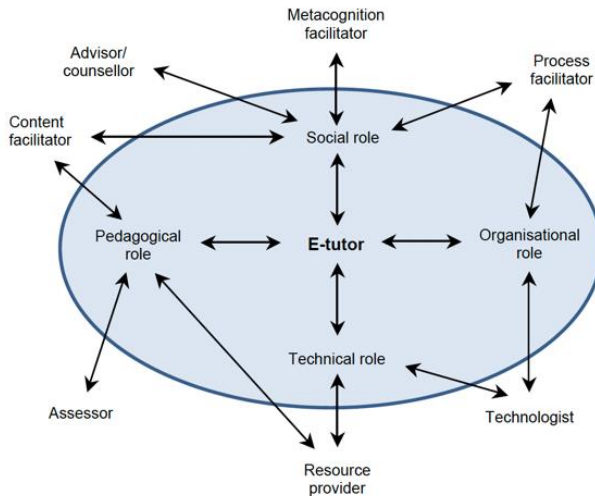


Figure 5 (Combined Roles of E-tutor, Goold 2010)

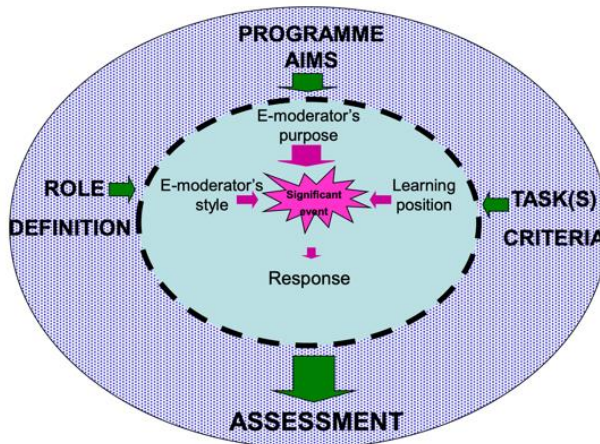


Figure 6 (The ring-fencing framework, Vlachopoulos & Cowan 2010)

Notably, some cross-functional competencies pertain to the area of time management [Packham et al. 2006, Cunningham et al. 2008, Okoro et al. 2021] and online leadership [Rogers & Aldhafeeri 2015]. Several studies [Janes 2006, Adnan et al. 2017, Sansone et al. 2018, Bustos-Contell et al. 2021, Shange 2022] confirm

the effectiveness of the role played by e-tutors in supporting motivation and emotional engagement, which are essential aspects in any learning experience: demonstrating empathy and interest, using humour, downplaying difficulties, and offering encouragement and reward are beneficial interventions against students' recurring feelings of isolation and insecurity. As tutoring functions are by nature evolving [Lentell 2003] due to technological innovations, adaptation to new learning environments, and the development of new lifelong learning modalities, training for acquiring specific skills is essential. Some contributions from universities in South Africa emphasize that the preparation and self-awareness of those who perform academic e-tutoring need to be further developed [Shange 2021, Okoro et al. 2021, Lebeloane et al. 2022], also with specific financial investments targeted to this aim. More generally, much of the reviewed literature emphasizes the need for training programs for e-tutors, whether they are professional figures, teachers, or experienced students. Indeed, if well organized, the support function in online and distance learning environments—whether on a technical level (help desk), a motivational and social level (encouragement, presence), or a conceptual level (knowledge construction)—is also effective in peer-tutoring contexts [Sansone et al. 2018, Silletti et al. 2021, Hardt et al. 2023]. The training for the development of the necessary skills for e-tutoring should consider several elements: instructional design perspective [Gerrard & Gerrard 2002, Cunningham et al. 2008, Bjekić et al. 2010], the importance of interactions in forum groups [Vasodavan et al. 2020], specific educational data literacy with elements of data analysis [Papamitsiou et al. 2021], and tools for competency self-assessment [Langesee et al. 2024].

The role of forum group moderation has been studied over the last two decades [Allan 2004, Sulčić & Sulčić 2007, Goold et al. 2010, Vasodavan et al. 2020], mainly focusing on the balance between synchronous and asynchronous activities. Some studies have highlighted the effectiveness of synchronous activities, which, when properly structured for distance learning environments, prove to be as valuable and appreciated by students as face-to-face activities [Adnan et al. 2017, De Jong et al. 2018, Slater & Davies 2020]. A detailed systematic review was recently devoted to the specific topic of asynchronous moderation [Ahlf & McNeil 2023]. Special attention is also given to the role of feedback: at the beginning of the century, following Laurillard [1993], who assumed human feedback as an irreplaceable feature of learning processes, the importance of effective feedback management by e-tutors supported by AI systems was emphasized [Allan 2004]; this importance, confirmed by other contributions [Packham et al. 2006, Rienties et al. 2019, Okoro et al. 2021, Lumadi 2023], has been revisited in recent years by studies done in

German universities. On the one hand, reliance on automated feedback can be effective in mentoring interventions within self-regulated learning contexts [Moser et al. 2022]. For instance, in self-assessment practices, students particularly appreciate systems that provide immediate responses for correction or reinforcement regarding learned content and completed exercises. Such systems can be valuable in courses with large classes and offer undeniable economic benefits. On the other hand, the role of feedback in e-tutoring processes is much broader and, as we have seen, encompasses pedagogical and social dimensions which are hardly replaceable by IA.

Recent studies have proliferated at the University of Dresden on these topics, showing [Claus 2020] that formative feedback is relevant for the conceptual/pedagogical and technological functions performed by disciplinary and technical e-tutors in a workgroup context. In the context of Virtual Exchange [Steinke et al. 2022], quality feedback has been proven to be essential since it not only addresses conceptual aspects (correction or explanation of content) but also provides positive emotional reinforcement, encouragement, and congratulation on recorded progress. The importance of integrating multimedia content such as images and videos into feedback, adhering to timely responses (quick response), and using suitable platforms for managing feedback is emphasized, following established theories and studies [Berge 2008, Alecar & Netto 2011]. Research on student reflections regarding their experience [Altmann 2022] confirms several characteristics identified by sector-specific scientific literature that make formative feedback effective. Consequently, a model for the specific training of e-tutors [Langesee et al. 2023], some significant experiences [Langesee et al. 2024], and a tool for self-assessing e-tutoring skills [Langesee et al. 2024] are presented. Following a systematic review [Langesee 2023], an updated framework is proposed that correlates functions and competencies (Fig. 7, Tab.3)

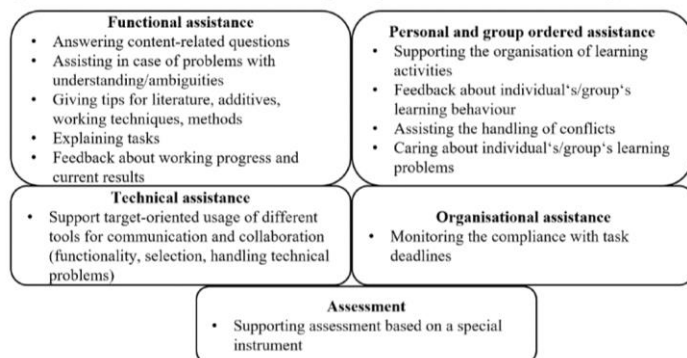


Figure 7 (Task of e-tutors based on Clauss et al. 2019, Langese 2023)

Task category	Task	Competence							
		Pedagogical (4)	Social (6)	Communication (6)	Media (3)	Organisational (5)	Individual (7)	Professional (4)	Evaluation (2)
Functional assistance	Answering content-related questions							X	
	Assisting in case of problems with understanding/ambiguities		X	o				X	
	Giving tips for literature, additives, working techniques and methods	o				X	X		
	Explaining tasks			X		o		o	
	Feedback about working progress and current results		X	X		o	o		
Personal and group ordered assistance	Supporting the organisation of learning activities	X	X	o		X			
	Feedback about individual's/group's learning behaviour	X	X	X			o		o
	Assisting the handling of conflicts		X	X			o		(o)
	Caring about individual's/groups' learning problems		X				X		
Technical assistance	Support the target-oriented usage of different tools for communication and collaboration (functionality, selection, handling technical problems)				X		o	o	
Organisational assistance	Monitoring the compliance with task deadlines				o	X	o		
Assessment	Supporting assessment based on a special instrument	o			o				X

Table 3 (Task-based competency profile, Langese 2023)

The issue of traditional roles being eroded by automated conversational agents emerges in a study from the same university [Lenk et al. 2021], which suggests that access management, organizational, academic, and technical support could be almost wholly automated (Table 4).

Task	Requirements for the Use of Conversational agents				Result
	Communication Task?	Initiated by Student?	Action Based on Existing Data?	Clear Reaction Process?	
Scheduling	Partially	No	Partially	No	✘
Facilitating	Partially	No	No	No	✘
Teaching Design	No	-	-	-	✘
Access Management	Yes	Yes	Yes	Yes	✔
Moderation	Yes	Yes	Partially	No	✘
Feedback	Yes	No	Partially	No	✘
Social Support	Yes	Partially	Partially	No	✘
Learning Analytics	No	-	-	-	✘
Organizational Support	Yes	Yes	Yes	Yes	✔
Academic Support	Yes	Yes	Partially	Partially	✔
Technical Support	Yes	Yes	Yes	Yes	✔
Learning	No	-	-	-	✘
Research	No	-	-	-	✘

Table 4 (Task of e-tutoring and conversational agents, Lenk et al. 2021)

In the Italian context, there are several studies on the topic of online tutoring roles: the social function and co-construction of knowledge are the focus of an Italian-led research conducted across 17 European states [Matteucci et al. 2010]; the perceived effectiveness by students with special educational needs of peer-tutoring practices in distance learning during the pandemic has been investigated by a research group at the University of Bari [Silletti et al. 2021]; studies and field research conducted at the Catholic University of Milan [Triacca et al. 2018, Ferrari & Triacca 2021] and the E-Campus online university [Raviolo 2019, Raviolo et al. 2021, Ferrari et al. 2021, Raviolo et al. 2023] focus, instead, on the evolution of tutoring roles in different e-learning contexts.

Further food for thought comes from a non-systematic review [Vegliante & De Angelis 2019] which, moving on the studies of important Italian experts in the field (as Galliani, Rotta, Calvani) confirms “the importance of the socio-relational dimension, especially in asynchronous communication modes, where the quality of interactions enhances students' motivation to learn, reducing dropout rates”. In exploratory research on MOOC courses of the EduOpen Portal [Vegliante & Sannicandro 2020], the role of e-tutoring appears to be expanding and taking on

the shapes of a new form of community management, while the importance of rapid feedback and the use of gamification for enhancing student engagement in e-tivities is reiterated. In this regard, a recent systematic review [Mauro 2022] investigates the intersection between e-tutoring, gamification, and practical learning.

Conclusions

Our review has confirmed that traditional roles of online tutoring, considered strategic in distance learning, have not undergone dramatic changes. Emotional scaffolding and moderation oriented towards cooperative learning from a constructivist perspective can hardly be fully automated. However, some e-tutoring functions can be progressively eroded and replaced by strategic use of AI; other functions can be effectively supported by new tools, supplementing specific human skills with increasingly high-performing ITS and advanced conversational chatbots. AI for data analysis applied to tutoring processes is certainly acquiring an essential role, making specific training in this area highly desirable for professional e-tutoring. Experimental research explores the integration of gamification in tutoring practices to increase students' engagement and the development of virtual tutoring systems and virtual-human tutors in an augmented reality environment. Finally, a promising line of research is the strategic use of feedback within online moderation with the aim of testing the possibility of integrating human experience and computational power.

Systematic time-limited reviews are desirable on specific aspects such as the integration of ITS in tutoring practices across distinct disciplinary areas and on the less studied topics at the intersection between e-tutoring functions, e-coaching, and e-mentoring within the context of virtual community management.

Therefore, specific field studies may be highly beneficial in assessing the efficacy of such pathbreaking innovations and the perceptions and expectations emerging from the ongoing experiences of teachers, tutors, and students.

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