BLENDED LEARNING IN ACCOUNTING EDUCATION: A COMPARATIVE ANALYSIS OF LEARNING THEORIES

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Abstract:

Learning theories reconstruct complex cognitive processes and provide useful mental models for the structure and design of courses. However, even for the most experienced professors, exploring them remains a challenge. Researchers around the world consider the development of theoretical models that contribute to the process of knowledge construction and experiential learning to be essential. In recent decades, there has been an increasing trend in the design of accounting courses through the integration of technology into traditional teaching. This has resulted in the emergence of new perspectives through the adoption of a blended teaching approach. This research deals with the investigation, analysis, and comparison of four fundamental learning theories: Behaviorism, Cognitivism, Constructivism, and Connectivism. Its contribution lies in the scientific documentation of the suitability of the theories that align with the needs within the framework of blended learning. The findings of the research are drawn from the literature review and the implementation of an experiment in an undergraduate accounting course. A blend of two theories emerged that align optimally in blended environments; specifically, the theories of constructivism with an emphasis on the social aspect and connectivism show a strong correlation, promoting student-centered teaching which increases student engagement by enhancing their knowledge and skills.

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1. Introduction

Researchers argue that theories of learning, in a broader context, seek to explain the perceptions that have been formed about the advantages and disadvantages of learning while aiming to explore these to implement optimal strategies (Al Lily, 2020; Ahmed and Opokou, 2022). However, it continues to question how and to what extent the blended learning approach, can meet the diverse needs of most learners/students within an extended context (Xao *et al.*, 2020). Theories of learning reconstruct complex cognitive processes and provide useful cognitive models in education for course structure and design (Georgopoulou *et al.*, 2023). These theories also provide insights into best practices in learning experiences. However, even for the most experienced teacher, exploring learning methodologies is a never-ending experience, as it is part of the academic process. Constructivist theory is closely linked to blended learning, and in a broader context theories of learning form the basis for knowledge expansion (Koehler *et al.*, 2014). Constructivism states that learners acquire knowledge as they try to understand their experiences. Constructivist theoretical models are used as frameworks for e-learning to state the transformation of an individual's experience into knowledge through a process of construction (Tavangarian *et al.*, 2004). Research reports that the constructivist approach used to build a learning system improved learners' knowledge (Brooks and Brooks, 1999; Alzahrani and Woollard, 2013). The extension of constructivist theory is social learning, which it argues that knowledge is constructed through social interaction, through which individuals can cooperate and communicate with peers and professors (Vygotsky, 1978). Learning can be derived from society which is a primary determinant of an individual's knowledge construction using communities, cooperative learning, and teamwork (Georgopoulou, 2024). Most of Vygotsky's theory supports themes of social interaction (Marginson and Dang, 2017; Tzuriel and Tzuriel, 2021).

Learning is related to and influenced by the world and individuals who can modify the knowledge they receive through social interaction (Jarvis, 2004; Georgopoulou, 2024). Constructivism, particularly social constructivism, offers those elements that contribute to the development of collaborative practices in contemporary society (Johnson, 1998; Choi, Johnson and Johnson, 2011). It supports blended learning, as a theory it focuses on online tools and environments while e-learning is based on a collaborative online learning environment (Al-Ani, 2013). Also, social constructivism is considered the foundation for the integration of technology in social sciences, where education is conducted in the online environment, facilitating interaction and active learning (Boston *et al.*, 2009; Fisher *et al.*, 2018). Moodle is an online platform based on a socio-constructivist approach to learning (Alhothli, 2015; Kottara *et al.*, 2024a).

In a study examining the effects of social constructivism, a positive relationship was found in this teaching approach since there was more effective learning as the

lecturers developed different ways of teaching that were student-centered and met the needs of the students. In addition to the social constructivism approach, blended learning has been associated with other theories, such as behaviorism, but to a much lesser extent (Swan *et al.*, 2009). Computer-assisted learning is the presentation of a problem (stimulus) that is solved (response) with the learner's input and through feedback. It has been found that interactive quizzes in e-learning environments help learners to practice and get immediate feedback, which influences the change in their behaviour and attitude (Gamage *et al.*, 2019). In recent decades, it has been observed that experiential learning has moved away from behaviorism and become more associated with blended learning (Beard, Wilson, and McCarter, 2007; Baasanjav, 2013). Learning platforms must be updated to understand how adults learn through experiential learning and how they interact with new technology (Al-Ani, 2013; Jordan and Samuels, 2020; Al-Hunaiyyan *et al.*, 2020).

This article is part of a research study conducted on the implementation of blended learning in an accounting course at a university in Greece and a business administration department. The research was semi-experimental, deductive, and had a blended methodological approach. The main purpose of the initial study was to evaluate the blended teaching approach through the implementation of blended learning with the adoption of the flipped classroom, exploring the learning outcomes, satisfaction and retention of students, about the traditional teaching method.

The article aims to explore and compare various learning theories, with a primary focus on presenting insights derived from initial research. Specifically, it seeks to identify and highlight which theories are most effective in supporting and enhancing blended learning environments. Specifically, this study will thoroughly examine the four main learning theories, Behaviorism, Cognitivism, Constructivism, and Connectivism, and how Constructivist theory is directly related to the didactic approach to blended learning. Therefore, this research contributes to our understanding of blended learning through a detailed analysis of four key theories, documenting the extent to which each is relevant to blended learning. Although the theoretical framework focuses on socio-constructivism, as it is most closely associated with blended learning environments, the comparative study highlights the varying degrees of relevance of the other theories, enriching the relevant literature.

2. Background of Research

Different learning theories should be applied in accounting education to enhance learning outcomes and address diverse learners' needs. As such, Silva (2018) identifies the application of different learning theories, including constructivism, behaviorism, humanism, cognitivism, and social cognitivism, which are necessary for considering the origin, cultural experiences, and various learning styles of students. The study identifies that accounting professors must avoid standardized methodologies and adopt flexible teaching strategies if they are to be successful. Weegar and Pacis (2012) compare

behaviorism with constructivism and observe that while in constructivism, learning is viewed as an active process whereby students construct knowledge based on their experiences, behaviorism focuses on observable behaviors shaped by reward and environmental prompts.

Their findings show that constructivist approaches, emphasizing cooperation, problem-solving, and active learning, have been highly effective in educational settings and become increasingly relevant with the growing integration of technology to support constructivist educational environments (Georgopoulou, 2024).

Furthermore, Moedritscher (2006) develops this idea when comparing three e-learning methods based on constructivism, behaviorism, and cognitivism correspondingly: "*In the efficacy of the method, as well as in the student's estimation, constructivistic and behavioristic methods are at an advantage over cognitivist ones.*" It is outstanding that even in constructivist contexts, which are so favorable for collaborative work, individual tasks were more effective in knowledge transfer. Duff (2014) criticizes the traditional approach of accounting education research, which focuses on personality traits, learning styles, and individual approaches to learning. The institutional and cultural environment of accounting education is particularly called for attention, and integration between these different perspectives on individual differences is highly needed.

According to Duff, the use of frameworks such as SAL, Kolb's Experiential Learning Model, and Curry's Onion Model places teaching approaches within a wider context. Kwofie-Acquah (2020) synthesizes the contributions of behaviorism, cognitivism, and constructivism to accounting education in useful frameworks that these theories offer for instruction and learning.

Constructivism supports inquiry-based, student-centered learning, cognitivism focuses on mental functions such as memory and problem-solving, while behaviorism focuses on rewards and penalties as a method of learning. Finally, Faidley (2018) compares the learning outcomes of online versus in-person accounting courses. The findings indicate that students attending in-person classes fare better overall. According to the study, age and gender are also important variables; female and nontraditional-aged students fare better in both in-person and virtual learning environments. The findings really point out how demographic considerations are very important in the development of accounting education curricula.

To sum up, incorporating a variety of learning theories into accounting instruction provides a flexible, inclusive, and effective learning environment. Educators are encouraged to combine constructivist, behaviorist, and cognitivist approaches by considering both individual and cultural variables that may enhance student learning. These findings provide a background for the subsequent section, which undertakes a detailed comparison of major theories of learning –constructivist, cognitivist, and behaviorist– along the dimensions of propositions or principles, applications, and implications for accounting and blended learning.

3. Literature Review

3.1 Blended Learning

Online university courses are increasingly deployed in higher education and thus, many studies have been conducted comparing their results with traditional face-to-face classes (Harrell and Wendt, 2019; Asonitou *et al.*, 2020). In addition, the benefits and challenges of distance education have been the subject of continuous debate in the past and nowadays.

The issue of distance education has become more immediate and contemporary due to the COVID-19 pandemic (Xiao *et al.*, 2022; Kottara and Zaridis. 2024b) and has forced most higher education institutions to turn to either distance education or some form of hybrid teaching model such as blended learning (Ahmed and Opoku, 2022; Kottara and Asonitou, 2024c). The challenges that have been raised in previous studies, regarding distance learning include the change in the quality of instructional instruction, students' unequal access to the key technologies for distance learning, and students' technological readiness.

Despite the challenges, this sudden and unexpected change in the learning environment offers opportunities for academic institutions to rethink innovative ways of learning that take advantage of current technologies. Therefore, the prospects and opportunities for new teaching methods, such as e-learning and blended learning, require thorough evaluation (Kottara *et al.*, 2024b).

Blended learning is considered a manifestation of e-learning. In particular, it is a hybrid of traditional learning - face-to-face - and e-learning. Teaching takes place both in the classroom and online, where the e-learning component is a natural extension of traditional classroom learning (Azleen and Nor-Aziah, 2015).

The blended approach alternates the use of multiple modes of course delivery, intending to optimize the learning outcome and the cost of the educational program. It further focuses on optimizing the achievement of learning objectives by applying the 'right' learning technologies to transfer the 'right' skills to the 'right' person at the 'right' time (Duff, 2004). Blended learning can lead to radical improvements in both the effectiveness, flexibility and cost-effectiveness of learning compared to traditional approaches.

In higher education, in recent years, the integration and incorporation of ICT (Information and Communication Technologies) into traditional courses has been observed, while the factors of the blended teaching approach and its degree of effectiveness are being investigated.

The process of knowledge acquisition by the student, in correlation with previous experiences, is shown to be important, mainly because the focus of interest and immediacy of engagement is maximized, especially if the subject matter of the course can be used, in the student's daily life (Kottara *et al.*, 2023; Kottara *et al.*, 2024d). However, the absence of proper planning in the learning process by the professor may not bring about

a satisfactory result in terms of learning outcomes, satisfaction and effectiveness of the blended teaching method (Kottara *et al.*, 2024e).

3.2 Behavioural Learning Theory

The behaviorist educational model is a stereotypical way of teaching and learning that prevailed in the first half of the 20th century with Pavlov's experiments and is still used today by various educational institutions and organizations (Muhajirah, 2020). Typically, learners respond to the motivation provided by the learning environment, practice learning skills, and demonstrate through assessment tests that they receive the knowledge provided regardless of which class they participate in (Dempsey and Zhang, 2019).

The behaviorist school of thought claims that learning is a "black box" activity, as there is no knowledge about the learner that focuses on their efforts and the management of external, observable behaviors.

Behavior is considered objective and can be observed and evaluated according to an organization's response to positive or negative stimuli or incentives from the environment (Ertmer and Newby, 2013). According to behaviorists, the learner is a passive recipient of the knowledge offered by a pre-designed training program, which sets specific performance objectives and describes the expected competence of the learners at the end of the course. That is, the knowledge and skills that have been set from the outset by the training program and which should be acquired after a course of study, regardless of whether the learners' expectations and needs are actually met.

The aim of the training focuses on the learner in order to understand and accept the objective reality, which is the same as that of the trainers and the books. Professors are solely responsible for the education of their students and expect them to understand and know the knowledge they and the literature provide. The outcome of learning is manifested by the emergence of new and measurable behavior by the learner, who is rewarded for the desired outcome, usually with grades. It is no coincidence that learning success is rewarded (even today) in this way. Behaviorists believe that the best way to induce desired behavior is to reward effort.

Reward is an external motivator that plays an important role in reinforcing, and possibly replicating, the desired behavior of learners. In behavioral teaching methods, the knowledge to be imparted is broken down into parts, and chapters, which are arranged linearly and offered separately and in sequence. That is, in order to present the next module or chapter, the previous ones must be completed. Learners must respond to the motivation provided by the environment, practice learning skills, and demonstrate through assessment tests that they are taking in the knowledge provided.

From this model emerges a stereotypical way of teaching and learning, which prevailed in the first half of the 20th century and is still largely used in everyday teaching practice today. Although behaviorism has contributed to the explanation of some learning phenomena, the model of education it introduced and the teaching practices that result from it have been strongly contested in recent years (Kottara *et al.*, 2024f).

The criticism focuses mainly on the importance that behaviorism gives to external behavior and external conditions of learning and, at the same time, neglects the role of the higher mental functions of the learners (Garrison and Vaughan, 2008). Dragonas *et al.* (2015) emphasize that behaviorism considers the learners' mind as an "unwritten table" (tabula rasa) that must be filled or a mirror that reflects the reality that is taught to them. In this way, training focuses on the efforts of the trainees to accumulate knowledge and the efforts of the trainers to transmit it, i.e. a process of passive acceptance of the knowledge offered by a pre-designed training program. Learning with bi-biorhythmic teaching methods is a process in which learners acquire information and acquire basic skills, while the outcome of the educational process ends up being directed and controlled. According to this view, if learners are trained to repeat certain processes, then they are considered to have learned (Ertmer and Newby, 2013).

Learning theory differs from instructional theory, as learning theories describe how learning is carried out, while instructional theories explain how the expected learning outcomes can be achieved. Notably, behaviorists assess learners in order to examine their prior knowledge, while cognitivists assess them to determine their disposition to learn (Garrison and Cleveland-Innes, 2010; Garrison *et al.*, 2010).

It is becoming clear that instructional design can be viewed from a behavioral or cognitive approach rather than a constructivist one (Weegar and Pacis, 2012). Designing instruction using a behavioral or cognitive approach requires the professor to analyze the situation and then set specific goals. These objectives correspond to learning objectives and are usually developed through task assignments. Assessment is based on whether specific criteria are met for each objective and the professor as the designer determines what the learner should know upon completion of the content, in a curriculum or course (Ziafar and Namaziandost, 2019).

3.3 Cognitive Learning Theory

Cognitive learning theory was initiated by Jean Piaget (Barrouillet, 2015), and states that knowledge is constructed from the learners' existing cognitive structures, while learning is based on what the learner knows (Ahmad *et al.*, 2012). Piaget argued that learners develop 'schemas' as they are exposed to different levels in the educational process, gaining different experiences (Webb, 1980).

Cognitive learning theory lays the foundation for how concepts and organized processes are analyzed, especially in terms of curriculum design. According to Wooten (2018), knowledge is the result of the interaction of experiences (old and new) to which an individual is exposed. Professors organize the course in such a way that it is a new experience in the knowledge that is assimilated or accommodated by the learner's previous knowledge or 'schema'. Subsequently, learners can understand how they interact in relation to new concepts and old information even when technology is applied to the learning process (Graham, 2012; Graham *et al.*, 2013; Keskin, 2019). However, although cognitive theory has focused on the organization of educational content, it focuses more on the actions of the professor rather than the learner. In contrast, to

constructivist learning theory, where knowledge and the educational process is considered more holistically (Almasi and Zhu, 2020; Onah *et al.*, 2020).

3.4 Constructivist Learning Theory

Constructivist theory advocates the view that learning is acquired through an interactive process based on prior knowledge, and the founders of the theory were Jean Piaget and Lev Vygotsky (Marginson and Dang, 2017). Piaget proposed the cognitive constructivist theory of learning which states that, the individual builds or constructs new knowledge based on existing knowledge. Vygotsky, on the other hand, states that the social constructivist theory of learning is linked to the interactions of learners and knowledge emerges through this interaction (Tzuriel and Tzuriel, 2021). More specifically, Vygotsky expressed that learners are active, not passive, and have the ability to construct their own knowledge based on their level of experience. The assumptions of Vygotsky's theory are as follows (Vygotsky, 1978):

- Cognitive skills are mediated through psychological tools or mediators that facilitate the transformation and evaluation of cognitive processes and functions such as language, words, measurement systems, mnemonic techniques, algebraic symbols, and writing patterns.
- Cognitive skills, developed in socio-cultural environments.
- Knowledge is collaborative and develops as people interact in social environments.

This implies that social interaction is important both for human existence and for education. Social constructivism argues that individuals build their patterns of learning as they interact with others. It views learning as a process where learners actively construct their representation of learning according to their prior experience and knowledge. Social constructionists state that knowledge is more constructed (Tzuriel and Tzuriel, 2021).

According to Biggs (1993), designing educational activities with the constructivist approach should include elements of collaboration, and real-life examples, allowing for different perspectives and representations of ideas. This approach makes the teacher play the role of a facilitator, enabling learners to then construct their own knowledge and this element is very much related to the blended learning approach (Garth-James Hollis, 2014).

Constructivist theoretical models, used as theoretical frameworks for e-learning, are used to state the transformation of knowledge through online experience and through the process of actualizing this construction (Huang, 1997; Tavangarian *et al.*, 2004). The constructivist approach to building a learning system shows how it can improve learners' knowledge (Blume et al., 2010). Blended learning is based, for the most part, on the social constructivist framework (Al-Huneidi and Schreurs, 2013), where e-learning has shifted to a collaborative online learning environment (Nicholson, 2007).

Social constructivism focuses on the mental processes by which the learner can construct their own knowledge, rather than simply acquire it (Akyol and Garrison, 2011;

Driscoll *et al.*, 2012). In the context of online collaborative learning, social constructivism is also a theoretical foundation for the integration of technology in the social sciences (Garrison and Arbaugh, 2007). Moodle is an online platform, which is based on a social constructivist approach to learning. A study examining the effects of social constructivist approaches to learning using the computer found a high degree of effectiveness (Arbaugh *et al.*, 2009).

Learning is seen as modeling the processes of interpretation and construction of meaning and knowledge acquisition, which can be acquired through e-learning, i.e. it is directly related from a constructivist perspective. In addition to social constructivist theories, blended learning has also been associated with other theories, but to a lesser extent (such as behaviorism and cognitivism). However, computer-based learning resembles the presentation of a problem, where a solution is then provided with the learner's contribution (Zimba *et al.*, 2021).

It has also been found that interactive quizzes in online environments help students learn accounting through direct feedback provided by professors (Yuen, 2011). The development of learning platforms positively affects the education of adults as they learn through experiential learning, interacting with new technology, even in accounting courses (Boyce *et al.*, 2012). It is documented that constructivist theory (especially social) plays an important role in blended learning (Akyol and Garrison, 2011).

3.5 Constructivist Learning Theory and Conceptual Framework C.o.I

Through the literature review of the most prevalent theoretical approaches to learning, their modern application through e-learning was highlighted, while the prevalence of the constructivist theory was evident.

However, the present thesis focuses on empirical investigation of the application of e-learning and more specifically blended learning, in the Department of Business Administration of the University of Athens, taking into account the research tools provided by the constructivist school, associated with the application of the C.o.I framework, through the Moodle platform for asynchronous education and MS-teams for synchronous education.

The Community of Inquiry is a concept referring to a group consisting of an and a class of learners, who are engaged in learning and/or research. The concept of C.o.I was developed by Garrison, Anderson and Archer (Garrison Anderson and Archer, 2000; Archer, 2010).

The Community of Inquiry is a constructivist model that identifies social, cognitive, and didactic presence to define and describe measurable elements that support the development of online learning communities (Swan and Ice, 2010).

According to the above, an online classroom in an environment such as Moodle is a community that undertakes to conduct a collective investigation around a topic, problem, or challenge and to develop skills such as problem-solving. The students and teachers who participate form a community of inquiry under certain conditions. Therefore, the holistic concept of a community of students and teachers engaged in

learning and research is the definition of the basic term "community of inquiry" (Lipman, 2003). Knowledge is embedded within a social context and therefore there is an inter-subjective (between individuals) agreement involved in the investigation process. Several researchers argue that the C.o.I framework is the most popular in the blended learning educational approach (Swan *et al.*, 2008; Zhang, 2020; Maddrell, 2020; Malan, 2020; Kim and Gurvitch, 2020; Ekasari et. al., 2020; Yandra *et al.*, 2021; Fayyad *et al.*, 2022; Guo, 2024). Developing a Community of Inquiry in a blended classroom can:

- Encourage students to explore concepts and issues in the course.
- Help students appreciate the interconnectedness of different courses.
- Enhance communication and collaboration skills, both online and offline.
- Motivate students.
- Help students deepen their knowledge and reflect.
- Build meaningful relationships between students and teachers.
- Promote student retention in the classroom.
- Enhance active engagement and communication.
- Enhance the development of skills that help connect with the job market (such as digital skills, critical thinking, and problem-solving).

The Community of Inquiry framework provides students, through blended learning environments, with the structure to acquire learning experiences with a high degree of satisfaction, retention, and engagement in the educational process.

3.6 Connectivism Learning Theory

This theory describes how people learn in the digital age through the exchange of information using the internet. The proponents of this theory, Siemens (2005) and Downes (2010) tried to explain that the internet and its applications have facilitated the way in which people share information and learn in an era that is increasingly technologically advanced.

This theory explains how digital technology, through blogs, wikis, discussion forums, social media, and email, can facilitate the educational process through the exchange of information. Specifically, learning begins when the student connects to the academic community (online) and shares knowledge with members of the community. The learning community here refers to those who have the same interests and encourages dialogue, information exchange, interaction, and discussions. That is, knowledge is shared in a network of connections that then share information and exchange opinions or concerns (Kop and Hill, 2008). According to Siemens (2005), learning takes place in an ambiguous environment that is constantly changing, especially in a digital age, according to the following principles of connectivism:

- Learning and knowledge are based on a variety of perspectives.
- Learning is a process of connecting specialized nodes or sources of information.
- Learning can be located on devices (non-human beings).
- Maintaining connections is required to facilitate continuous learning.
- The ability to combine ideas and concepts is a basic skill.

- Decision-making is a learning process.

Connecting the theory of connectivism with blended learning, it is understood that teachers need to be able to create an educational environment in which students have the ability to connect and communicate with each other through discussion forums, or with e-mail messages and assessment tasks. In this way, each teacher creates a perspective for students to learn by interacting with their peers, either online through their participation in forums or by solving quizzes in Moodle or working on tasks assigned to groups (Downes, 2012). Below is a table that concisely presents the four major learning theories along with their key elements.

Table 1: Learning theories

Learning theories	Behaviorism (early 20th century)	Cognitivism (beginning of the 1950s, contributed to the departure from behaviorism)	Constructivism (decades of the 1970s and 1980s, pedagogical theory with wide acceptance)	Connectivism (21st century)
Key elements	- Fragmented isolated knowledge - The trainee accepts any information - Knowledge conveyed by the professor - Passive learning. - The result is controlled.	- Knowledge is influenced by the basic characteristics of the learners. - The learner is an information processor. - The teacher is part of the educational process and begins to take an active role. - He receives the information and processes it cognitively while storing it in his memory. - Passive receiver of knowledge.	- The acquisition of knowledge leads him to the construction of knowledge (meaning). - Can e-learning be used as a dominant part of the educational process? - The professor, through the learning process, engages the learner actively in the educational process (they are not a passive recipient). - It considers the individual's prior knowledge and develops corresponding skills according to the educational experience. - It promotes the solving of real problems and reflection. - It enhances interaction, which creates the conditions for experiential learning and keeps the learners engaged in the classroom.	- It is based on the view that technology affects what, how, and where a person learns. - Learning is more collaborative, and the professor is a facilitator. - The learner develops the ability to discern important information. - He is an active member even in an online class based on e-learning. - Acquisition of knowledge in the digital age, development of digital skills. - It considers the individual's prior knowledge and applies it using computers.

Source: Compiled by the authors.

4. Comparative Analysis

The following comparative analysis focuses on the connection of four basic learning theories with blended learning while examining their contribution to the educational process in accounting courses. The theories are analyzed according to the following criteria, as they emerged from the literature review, specifically in terms of their basic

principles, their strengths and weaknesses, their alignment with blended learning, and their relevance to accounting education.

4.1 Behaviorism

Behaviorism is based on the idea that learning is a change in behavior caused by external stimuli and reinforcements. It does not focus on in-depth effort but has a procedural character in the educational process. The trainees are passive recipients of the knowledge offered, which is strictly tied to the course outline and not to the expectations and needs of the trainees. There is strict educational content in linear chapters that does not deviate from the stereotypical teaching. The learning of students, as a result, is measured and rewarded exclusively with grades, and its outcome is predetermined and controlled.

4.1.1 Strengths and Weaknesses

While behaviorism does provide a clear structure and hence is relevant for learning basic skills such as recording accounting entries-its limitations immediately become apparent in that it does not encourage two of the most necessary abilities in accounting practice: critical thinking and problem-solving.

4.1.2 Relevance to Blended Learning

The contribution of Behaviorism to blended learning is very limited. Its linear and non-interactive framework does not fit the demands of modern educational environments that are integrative of technology and collaborative in nature.

4.1.3 Relevance to Accounting Education

In accounting education, Behaviorism can only be employed for teaching mechanical skills, like the memorization of rules or repetition of the accounting procedure. However, this is not flexible and could not be very useful for more complex skills, such as the analysis and synthesis of data.

4.2 Cognitivism

Focuses on the process of building knowledge based on pre-existing knowledge and experiences. It is more related to traditional teaching and not to blended learning environments, while knowledge comes from and is based exclusively on pre-existing knowledge. The educational content is built upon prior knowledge.

There is an effort by the professors to increase student interest, without restructuring the educational content to meet modern requirements and student needs. The actions of the professors are considered more important than those of the students. It constitutes a teacher-centered approach. Students have a passive role in the educational process.

4.3 Strengths and Weaknesses

This theory provides logical continuations in learning and enhances connectivity between new concepts and old knowledge, which might be of good use when introducing elementary concepts of accounting.

Still, it restricts the professor-led guidance too much and fails to adjust, or could not, to meet the students' needs; hence, it would be ineffective in dynamically engaging learning environments such as blended learning.

4.3.1 Relevance to Blended Learning

Cognitivism is not well-matched with blended learning because its traditional approach is teacher-centered and does not allow the use of digital tools or the active participation of the students.

4.3.2 Relevance to Accounting Education

In accounting education, Cognitivism could contribute to teaching principles that are based on preexisting knowledge about the structure of financial statements. At the same time, it does not correspond to modern learning tools, and thus, it is worse at developing complex skills.

4.4 Constructivism

Constructivism promotes learning as an active and social process. It shows a high level of correlation with electronic and blended learning environments as it forms the foundation for the integration of technology into the social sciences. There is significant interaction with the learners and a dynamic student-centered approach, while the professors focus on how adults learn. Digital educational tools are also used, highlighting active and experiential learning (students are not passive recipients of knowledge). The knowledge and skills can be used in aspects of daily life and outside the university.

A holistic approach is taken regarding the demographic characteristics of the students and the presence of the professors. Through activities of asynchronous and synchronous distance education, ideas and teamwork are developed. Educational design and the redesign of the course for application in blended learning environments focus on the higher levels of Bloom's Taxonomy.

The development of skills that aid in content comprehension and connection to the job market is enhanced. The interaction with digital educational material enhances the acquisition of students' learning outcomes (mind maps, etc.). Grades derive not only from the final exams of the course but also from individual and group assignments, as well as from the workload in L.M.S platforms like Moodle.

The educational material is quite engaging with the aim of stimulating students' interest and their level of involvement. The professors encourage and assist the students as members of a community to gain an experiential learning experience. The teaching presence is linked to student satisfaction.

The community that is created in the blended classroom and the interaction contribute to student retention. The inquiry community activates interest and provides immediate feedback through digital educational tools, such as e-voting, quizzes, etc. The inquiry community makes the student-teacher relationship significant. Educational activities are conducted before class, during class, and after class (implementation of the flipped classroom).

4.3.1 Strengths and Weaknesses

Constructivism enhances creativity, critical thinking, and collaboration. In turn, this requires more from the professors in terms of engagement and more extensive lesson preparation.

4.3.2 Relevance to Blended Learning

This theory is closely related to blended learning because it calls for the adoption of both synchronous and asynchronous tools like Moodle in order to create and develop a learning community, encouraging a student-centered approach and enhancing higher-order cognitive skills.

4.3.3 Relevance to Accounting Education

Constructivism adds a lot of value to the accounting course. The learners will develop problem-solving and analytical skills through practical applications in the construction of financial statements and the usage of data management tools. Experiential learning integrates a student's theoretical learning into professional practice.

4.4 Connectivism

Connectivism is based on the connection of knowledge through digital tools and the creation of information networks. It has a direct correlation with e-learning and promotes the digital age; it is inextricably linked with blended learning, which is an expression of modern technologies in the field of education. It supports e-learning in combination with traditional teaching, creating the conditions for the application of blended learning through the exchange of knowledge and information. Digital educational tools are an integral part of educational technology, as knowledge is offered even through digital tools and devices, replacing the physical presence of teachers. The process of evaluating students is provided with flexibility, as it can be carried out using LMS such as Moodle and MS Teams, helping students to develop the corresponding digital skills. Students are provided with continuous and unrestricted knowledge, with the possibility of self-regulated learning. Students are not required to have a high level of ICT knowledge, but they are given the opportunity through their engagement with distance synchronous and asynchronous education to improve and apply it even in their daily lives, beyond the university environment.

4.4.1 Strengths and Weaknesses

Connectivism helps students to foster self-regulated learning and flexibility to get themselves introduced to emergent technologies like LMS and MS-Teams. However, it requires the students to be at least fundamentally technologically literate, which may be a bit demanding if the students are not used to digital tools.

4.4.2 Relevance to Blended Learning

It is also directly related to blended learning, as the theory itself gives full support to combining traditional methods with digital ones. Digital tools enhance collaboration and the exchange of knowledge.

4.4.3 Relevance to Accounting Education

Connectivism is the right suit for teaching currently existing practices and tools within an accounting degree course, like analysis of information in spreadsheets and with ERP software. Flexibility in learning enables them to address the challenges posed by such a profession, while technology emphasizes relevance to the labor market even more.

We, therefore, conclude that Constructivism and Connectivism are the theories that best support blended learning in accounting education. They enhance the development of critical skills, such as critical thinking and problem-solving, while promoting students' technological readiness. The other two theories have limited application, they support basic knowledge and skills development only. Below is a table that concisely presents the comparative analysis of the four learning theories.

Table 2: Comparative analysis of learning theories (Source: Compiled by the authors)

Learning theories	Characteristics	Suitability	Alignment with blended learning
Behaviorism	• Fragmented knowledge • Passive learning • Teacher-centered approach	X	• Weak correlation with e-learning • Students are passive recipients • Pre-planned educational outcome
Cognitivism	• Professors' active role • Focus on acquiring knowledge • Passive recipients	X	• Strong correlation with traditional teaching approach • Prevalence of the teacher's actions • Teacher-centered approach
Constructivism	• Knowledge construction • Involvement of learners • Experiential learning	✓	• Strong correlation with e-learning • Strong degree of interaction • Student-centered approach
Connectivism	• Learning is based on technology • Cooperative learning • Active role of the learner	✓	• Strong degree of correlation with blended environments • Learning through the exchange of electronic information • Use of digital educational tools

5. Discussion and Conclusions

According to the theories that were examined and analyzed, it became evident that the blended teaching approach is more based on social constructivism, or constructivism, in which the Community of Inquiry (C.o.I) model has been developed through cognitive, social, and teaching presence (Adams, 2020; Ameri, 2020; Kottara *et al.*, 2024a).

It constitutes a social constructivist model of learning processes in online and blended environments and has been influenced by the work of John Dewey and the constructivist views of experiential learning (Rourke and Anderson, 2002; Rodgers and Raider-Roth, 2006; Arbaugh, 2009; Delfino and Manca, 2007; Swan *et al.*, 2008).

Even an online classroom constitutes a type of community, which undertakes to conduct a collective investigation around a certain topic, problem, or challenge and to develop problem-solving techniques (Kottara *et al.*, 2023). The students and professors who participate form a research community (social presence) under certain conditions (Lipman, 2003; Ahmet and Opoku, 2022).

This model can define, describe, and provide measurable elements that support the development of online learning communities. (Swan and Ice, 2010; Xao *et al.*, 2020). It also implies that a valuable educational experience is embedded in a community of professors and learners who engage in the educational process with the aim of creating deep and meaningful learning. Swan (2001) concluded that interaction with professors led to higher student satisfaction as they learn from experience and not just by listening to a lecture.

It is noted that experiential learning is more powerful than lectures and worksheets, given that students can better understand concepts when the professor provides them with the opportunity and means to apply them in the educational process (teaching presence).

Garrison, in 2007, referred to the framework of learning regulation with elements such as:

- confirmation of understanding of the tasks,
- reminding others about the tasks or exercises, encouraging them to complete them with resources and activities,
- help with assignments and exercises, processes or learning products,
- the management through learning phases or tasks,
- the assessment of learning.

Social constructivism interprets learning as a social and collaborative activity (Vygotsky's pedagogical thought), as learners can succeed if they work in collaboration with others or under the guidance of their professors.

However, a very important point in Vygotsky's theory is the fact that learning is more effective if learners work on content that is meaningful to them and if they are guided to construct their knowledge by examining examples that depict real-life situations.

Blended learning focuses on optimizing the achievement of learning objectives by applying the right learning technologies to transfer the right skills to the right person at the right time. (Singh and Reed, 2001). However, in e-learning, not only constructivism but also connectivism is emphasized (Vygotsky 1978; Picciano 2009; Al Lily, 2020). From the literature, it emerges that in blended learning, the theory of constructivism and connectivism constitute a valid theoretical combination, which is also related to the fields under examination in the present research. Additionally, there is the perception that learning begins when students connect online, as they interact and share knowledge with members of the academic community (Kottara et., 2024d; Kottara *et al.*, 2024f). Several studies based either on social constructivism (Al-Htaybat 2018; Boyce *et al.*, 2019) or on the theory of connectivism learning, arrive at the same conclusion which states that they contribute to the effectiveness of learning as the educational experience increases student retention given the high satisfaction they have experienced (Siemens, 2005; Downes, 2012; Matta, 2018; Vas *et al.*, 2018; Utecht and Keller, 2019; Hendricks, 2019; Bupo, 2019; da Costa *et al.*, 2022; Mutiga, 2023). Specifically, in Table 2, the main characteristics of the four theories are outlined.

In this research, a holistic comparative analysis of the four main learning theories was conducted, focusing on their contribution to the learning of accounting in a blended learning environment. The analysis of these theories was oriented toward their basic principles, strengths, and weaknesses, their alignment with blended learning, and their relevance to accounting education. It was found that within the theory of behaviorism, there is a structure for learning basic technical knowledge of accounting, but also limitations which do not help the development of critical thinking and problem solving (essential for accounting education). Also, blended learning is very limited. The same perspective is presented by cognitivism as it does not help in developing a blended learning environment. Instead, it promotes traditional teaching which is teacher-centered with reduced student involvement and limited use of technology.

On the other hand, constructivist theory promotes the development of skills and deep and active learning, creativity, critical thinking, and collaboration. Also, student engagement depends in many cases on the educational tools and the proper preparation of teachers, using modern digital tools. Constructivism is inextricably linked to blended learning by creating a learning community, encouraging a student-centered approach, and creating the conditions for an improved level of accounting teaching. Students have the opportunity to develop skills such as problem-solving and analysis through practical applications in the construction of financial statements and the use of data management tools. There is a link to the labor market, through the theory to practice with realistic scenarios promoted in blended teaching (synchronous and asynchronous). Equally key is the theory of Connectivism, which optimally facilitates self-regulated learning and flexibility to be introduced to emerging technologies and tools. Today's students are digitally literate and love technology which is a big part of their daily lives, and this makes them need to integrate digital tools into their educational path and experience,

In addition, this theory is actively and directly related to the blended teaching approach, supporting the combination of traditional methods and digital ones, enhancing collaboration and knowledge sharing. It was found to be fully aligned with the teaching of existing practice and tools in an accounting degree course, for analyzing information in spreadsheets and with ERP software. In this context, students can address the challenges posed by the accounting profession and the digital age. It is documented that Constructivism and Connectivism as theories support blended learning in accounting education to the greatest extent. At the same time, they enhance the development of critical skills such as critical thinking and problem-solving and promote the technological readiness of accounting students.

6. Limitations and Future Studies

An initial limitation is that comparative analysis is confined to the specific context of blended learning in higher education and, more precisely, in accounting education, which may limit its applicability to other sciences or learning environments. Another limitation is that the analysis treats learning theories as static constructs, possibly overlooking their adaptability and evolution in response to contemporary educational challenges, particularly in the context of rapid technological advancement. Thus, it neither considers problems that may appear in the application of blended learning tools, such as technological infrastructure, digital literacy, or access inequalities that can take place, impacting the real application of these theories, nor does it follow up with how the theories will impact students' professional skills and adaptability or their career choice in the long run, at least in the accounting area.

Given that the initial study focused quantitatively on student retention rates, learning outcomes, and satisfaction in the blended learning environment, further research can elaborate on how learning theories directly impact student outcomes, such as critical thinking, decision-making, and the development of practical skills in accounting. Also, studies can be done in other academic and cultural environments to be able to make a comparison with the findings. Finally, research on how emergent trends in education, such as microlearning, skills-based education, or adaptive learning supported by AI, align with the investigated learning theories could be conducted.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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