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Paradigm shift of learning theory: Behaviorism and Constructivism – present relevance in offline and online learning context.

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Abstract

If we go through the worthiest question in our life, i.e., how we learn?', then we need to know some basic theories of learning. In this paper, two major contradictory theories of learning, i.e., behaviorism and constructivism, have been discussed briefly. It also discusses the evolution of two foundational learning theories—behaviorism and constructivism, their continuing relevance in contemporary offline (face-to-face) and online learning environments. A behaviorist interprets learning in terms of the connection or association between stimulus and response. They studied how learning is affected by changes in the environment. In opponent, constructivists give the focus on the process of learning and creation as knowledge is constructed by internal perception and cognition. They viewed learning as 'a search for meaning'. In this context, a comparative analysis has been made to discuss how the paradigm has been shifted from behaviorism to constructivism. This review-based paper will also focus on the relevance of these two theories in online and offline learning contexts.

Keywords – Paradigm- shift, Behaviorism, constructivism, offline Learning, online learning.

Introduction:

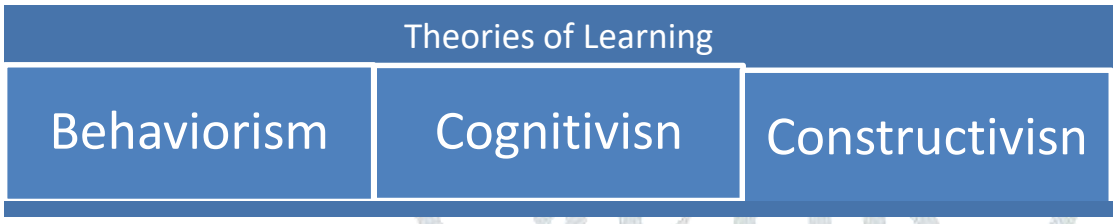
"If we live long enough, we learn. There are no boundaries to learning. But this raises the questions: 'What is learning?' and 'How do we learn?' In general, learning is a form of growth or change in a person, which is manifested in new modes or patterns of behavior. Learning is the process by which a behavior (in the broad sense) originated or changed through practice or training (Kingsley and Garry, 1957). From this definition, it is a process of permanent behavioral changes, also manifested by measurable and observable activities of the individual. We know man is the supreme animal of the world and their brain structure has transformed more and more complex structure to adapt to the evolutionary /progressive changes in society. Human behavior has changed from simple to complex; their learning techniques have also been modified with the rise of different learning theories. Learning theories are the source of verified instructional strategies, tactics, and techniques. It has a rich and diverse heritage. Schunk (1991) lists five definitive questions that serve to distinguish each learning theory from the others:

1. How does learning occur?
2. Which factors influence learning?
3. What is the role of memory?
4. How does transfer occur?
5. What types of learning are best explained by the theory?

So the three basic questions are

- ✓ How does learning occur? ---- Behaviorism.
- ✓ What is the factor of learn (information processing Model)? ---- Cognitivism
- ✓ How knowledge is processed or constructed? -------Constructivism

To find out the answer of these questions, numerous viewpoints or theories has been developed and exist today. At least three major learning theories can be identified.



Theoretical Background:

Behaviorism is a learning paradigm that focuses on observable and measurable behavior, centered on the question, 'What to do?' This theory was advocated by Edward Thorndike, Ivan Pavlov, John B. Watson, and B.F. Skinner. Pavlov's Classical conditioning and Skinner's operant conditioning focused on the role of environmental contingencies in shaping behavior (Pavlov, 1927/1960; Skinner, 1953). Behaviorists believe in decomposing complex performance into measurable objectives and sequences of stimulus–response–reinforcement. Instructional systems design was provoked by Thorndike's law of effect (1913). It included the task analysis and criterion-referenced assessment (Gagné, 1985).

Signature practices: clear behavioral objectives, direct instruction, worked examples and demonstrations, guided practice with immediate feedback, spaced and distributed practice, mastery learning with corrective loops (Bloom, 1968; Rosenshine, 2012).

Strengths: efficiency in building foundational skills; reliable gains where correct performance can be specified and practiced (e.g., decoding, computation, syntax, safety procedures).

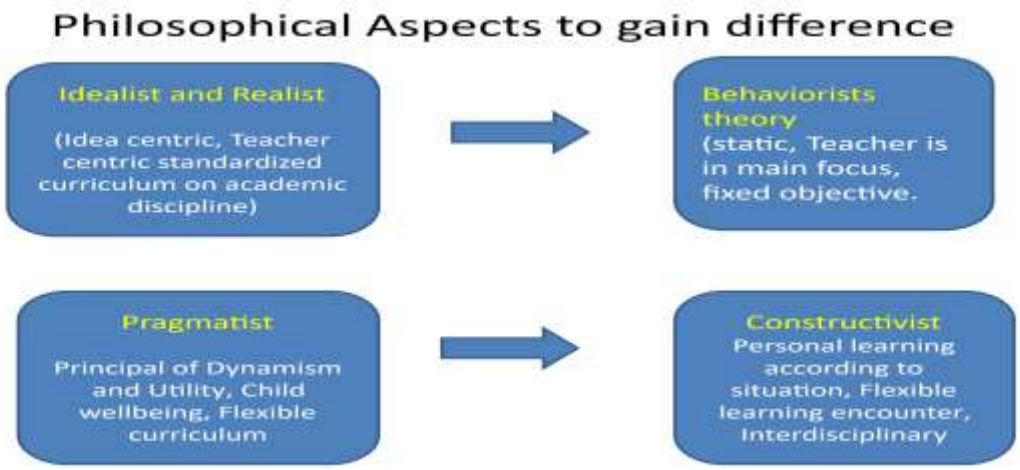
Limitations: under-specifies internal cognition and motivation; risks superficial performance if transfer and conceptual understanding are not also targeted (Bandura, 1977; Ausubel, 1968).

Cognitivist theory deals with mental processes (Thinking, Reasoning, Understanding, Memorizing, etc.) and is based on the information processing approach to learning. It places greater emphasis on the learning process and its underlying factors. Jean Piaget, Jerome Bruner, Robert Mills Gagne, Albert Bandura, Kohlberg developed this theory.

Constructivism is a philosophy of learning that deals with the construction of our own knowledge by internal experience, our rules and mental models via a social interactive process. 'How is knowledge processed? ' This is associated with cognitive theory and how one constructs one's knowledge by molding their ideas and creating new concepts or theories, a concept known as constructivism. John Dewey, Jean Piaget, Lev Vygotsky, and Jerome Bruner are the key contributors to this theory. Cognitive constructivism (Piaget) emphasizes assimilation in developmental stages (Piaget, 1952); Vygotsky's social constructivism highlights mediation by language and tools within the Zone of Proximal Development (Vygotsky, 1978). Situated cognition, communities of practice, and authentic learning extend these ideas to real-world contexts (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991). Bruner's spiral curriculum and discovery learning, and Papert's constructionism (learning-by-making with computational media), are also prominent (Bruner, 1960; Papert, 1980).

Signature practices include problem- and project-based learning, inquiry and design challenges, collaborative knowledge building, scaffolding and fading, reflection and metacognition, and formative assessment aligned with learner sense-making (Jonassen, 1999; Biggs, 1996).

Strengths: promotes deep understanding, transfer, adaptive expertise, and learner agency. **Cautions:** minimally guided approaches can overload working memory for novices; effective constructivist environments typically include strong scaffolds and guidance (Kirschner et al., 2006; Sweller, van Merriënboer, & Paas, 1998).



A paradigm is a set of ideas used for understanding or explaining something, especially in a particular subject or discipline. The **Oxford English Dictionary** defines a paradigm as "a pattern or model, an exemplar; a typical instance of something. **Thomas Kuhn** refers paradigm as the set of concepts and practices that define a scientific discipline at any particular period of time. In his book, 'The Structure of Scientific Revolutions" (first published in 1962), Kuhn defines a scientific paradigm as: "universally recognized scientific achievements that, for a time, provide model problems and solutions for a community of practitioners (Wikipedia). A paradigm in learning science can be defined as a set of concepts and practices related to theories, principles, models, taxonomies, methods, roles, and assumptions. 'Paradigm shift' is a fundamental change from the core concept and practices of a given domain discipline or field. American physicist and philosopher Thomas Kuhn explained it as a fundamental change in the basic concepts and experimental practices of a scientific discipline. The cognitive revolution starts with the rise of human information processing models. Yet classroom and corporate training practices rarely "replace" one paradigm with another. Instead, curricula integrate direct instruction for novice acquisition with guided inquiry for consolidation and transfer (Hattie, 2009; Mayer, 2004, 2009). Contemporary frameworks emphasize alignment—objectives, learning activities, and assessment methods mutually reinforcing (Biggs, 1996)—and guidance calibrated to prior knowledge (the expertise reversal effect) (Kalyuga, Ayres, Chandler, & Sweller, 2003). In the 21st century, the learning environment has changed due to technological growth, and the rapid use of ICT in education has made learning easier and more democratic. Students are facilitated with global knowledge with one click. The development of online learning has changed the traditional learning environment of brick-and-mortar classrooms to learning in cyberspace. According to Weeger and Pacis (2012), Behaviorism and Constructivism are learning theories that stem from two philosophical schools of thought, which have influenced educators' view of learning. Skinner and Watson, the two major proponents of behaviorism, studied how learning is influenced by environmental changes and sought to demonstrate that behavior could be predicted and controlled (Skinner, 1974). Piaget and Vygotsky, were strong proponents of constructivism, which viewed learning as a search for meaning and described elements that helped predict what students understand at different stages of development (Rummel, 2008). In this sense, the supposed paradigm shift becomes a **design blend**: start with explicit teaching and high guidance to build schema; transition toward complex, authentic tasks as learners gain fluency, autonomy, and metacognitive skill (Chi, 2009; Zimmerman, 2002).

Paradigm Shift and Design Blend

In the 20th century, when the cognitive revolution and the human information processing models were created, the narrative shifted from behaviorism to constructivism. Yet classroom and corporate training practices rarely "replace" one paradigm with another. Instead, curricula integrate direct instruction for novice acquisition with guided inquiry for consolidation and transfer (Hattie, 2009; Mayer, 2004, 2009). Contemporary frameworks emphasize **alignment**—objectives, learning activities, and assessment methods mutually reinforcing (Biggs, 1996)—and **guidance** calibrated to prior knowledge (the expertise reversal effect) (Kalyuga, Ayres, Chandler, & Sweller, 2003). In this sense, the supposed paradigm shift becomes a **design blend**: start with explicit teaching and high guidance to build schema; transition toward complex, authentic tasks as learners gain fluency, autonomy, and metacognitive skill (Chi, 2009; Zimmerman, 2002).

Comparative analysis of Behaviorism and Constructivism

Dimension	Behaviorism	Constructivism
Knowledge and Learning Goals	Knowledge as behaviors/performances meeting clear criteria; goals framed as observable outcomes (Bloom, 1956; Mager-style objectives).	Knowledge as coherent structures co-constructed through activity; goals include conceptual understanding, argumentation, and identity in communities of practice (Lave & Wenger, 1991).
Role of the Teacher	Instructor as expert modeler, sequencer, and feedback provider; designs practice conditions and reinforcement schedules.	Instructor as facilitator, diagnostician, and designer of scaffolds; orchestrates discourse, inquiry, and reflection (Bruner, 1966; Vygotsky, 1978).
Learner and Motivation	Motivation via extrinsic reinforcement; task engagement shaped by contingencies.	Emphasizes autonomy, competence, and relatedness (Deci & Ryan, 2000); self-regulated learning strategies central (Zimmerman, 2002).
Assessment	Frequent low-stakes quizzes, item-level feedback, mastery checks, performance analytics.	Performance assessments, portfolios, rubrics for reasoning and collaboration, formative assessment that elicits and responds to learner thinking (Black & Wiliam, 1998; Wiliam, 2011).
Design Heuristics	Task analysis → modeling → worked examples → fading → practice (with spacing, interleaving) → corrective feedback.	Problem framing → activation of prior knowledge → collaborative inquiry → scaffolding/fading → reflection and knowledge articulation → public product (Jonassen, 1999; Ambrose et al., 2010).

Present Relevance in Offline Learning

Behaviorist Opportunities in Classrooms:

Face-to-face instruction excels at rapid feedback cycles: teachers can model thinking aloud, probe responses, and immediately correct errors. Mastery learning routines—exit tickets, do-nows, and targeted re-teaching—improve foundational skill acquisition (Bloom, 1968; Hattie, 2009; Rosenshine, 2012). Spaced retrieval practice and low-stakes quizzing yield durable learning benefits (Dunlosky et al., 2013).

Design example: A mathematics lesson begins with explicit modeling of multi-step procedures (worked examples), followed by guided practice with immediate teacher feedback, then independent practice spaced across the week.

Constructivist Opportunities in Classrooms

Physical co-presence supports rich discourse, embodied and material engagement (lab equipment, manipulatives), and the subtle pedagogical moves of scaffolding. Project-based learning (PBL) leverages authentic community problems, culminating in public exhibitions. Teacher questioning and peer critique deepen conceptual understanding and disciplinary practices (Bransford, Brown, & Cocking, 2000; Barron & Darling-Hammond, 2008).

Design example: A science unit uses inquiry labs where students design and test models, supported by teacher-provided constraints and checklists. Reflection journals and poster sessions make thinking visible.

Integrative Practices

Effective classroom designs use **explicit instruction** to introduce core concepts. This is followed by **structured inquiry** activities that help students apply what they've learned. **Formative assessment** connects these two stages by revealing student misconceptions and guiding the next steps (Black & Wiliam, 1998; Wiliam, 2011).Digital tools enhance this process by providing **immediate, adaptive feedback** on drill-and-practice exercises, often with many questions. These platforms also allow for **mastery-based progression** and can automatically schedule **spaced and interleaved practice**. **Learning analytics** help educators monitor student progress and intervene promptly when needed. Additionally, the design of explanations and demonstrations should follow established **multimedia principles** (Mayer, 2009; Clark & Mayer, 2016) to ensure clarity and engagement.

Design heuristics for e-learning modules (behaviorist/cognitivist):

1. concise multimedia explanations with signaling and segmenting.
2. worked examples followed by practice.
3. immediate, elaborate feedback.
4. Mastery thresholds before advancement.
5. spaced retrieval via notifications (Mayer, 2009; Clark & Mayer, 2016).

Constructivist Affordances Online

Social platforms, learning management systems (LMS), and collaborative tools enable knowledge-building communities beyond the classroom. The **Community of Inquiry** (CoI) framework—social, cognitive, and teaching presence—summarizes conditions for deep, sustained discourse online (Garrison et al., 2000, 2001). Project-based and inquiry learning can flourish with shared documents, versioning, peer review, and reflective blogging. **Transactional distance** theory emphasizes structure, dialogue, and learner autonomy as design levers (Moore, 1993). Instructor "visibility" through timely facilitation and feedback is crucial (Anderson, 2008).

Design heuristics (constructivist online):

- establish norms and roles;
- seed inquiry with provocative, discipline-anchored prompts;
- scaffold argumentation (sentence stems, exemplars);
- use rubrics that value reasoning and collaboration;
- close loops with synthesis posts and reflective artifacts.

Managing Cognitive Load and Guidance Online

Online environments risk split attention, seductive details, and cognitive overload. Applying multimedia principles—coherence, signaling, modality, redundancy, segmenting—improves comprehension, particularly for novices (Mayer, 2009). The **minimal guidance** debate is salient online: purely discovery-based modules hinder novice learning; guided instruction with scaffolds (worked examples, worked solutions videos, hints) supports schema acquisition before open inquiry (Kirschner et al., 2006; Sweller et al., 1998).

Assessment Online

Behaviorist tools (quizzes with auto-feedback, mastery checks) can coexist with constructivist assessments (e-portfolios, peer assessment, project showcases). Formative analytics help instructors identify misconceptions and organize targeted interventions (Wiliam, 2011). Authentic assessment can be supported via multimedia submissions, code notebooks, or simulations, with rubrics emphasizing reasoning, process, and product quality (Jonassen, 1999; Biggs, 1996).

Evolving Roles, Tools, and Equity

Teacher Roles: Today's teachers play several key roles, no matter if they're teaching in person or online. They are **designers** who create tasks that align with learning goals, **explainers** who model strategies and make things easier to understand, **facilitators** who guide discussions, and **assessors** who use student work to adjust their teaching. To be effective, teachers need training in both direct teaching methods and how to lead collaborative and inquiry-based activities (Hattie, 2009; Rosenshine, 2012; Ambrose et al., 2010).

Choosing Technology

Technology isn't good or bad on its own—it's how we use it that matters.
Some tech features are great for direct, structured learning:

- **Adaptive quizzes:** Quizzes that adjust to the student's level.
- **Instant feedback:** Getting answers right away.
- **Mastery dashboards:** Tracking what students have learned.
- **Practice reminders:** Notifications for spaced repetition.

Other tools are better for collaborative, creative learning:

- **Discussion forums:** Spaces for students to talk and build on each other's ideas.
- **Collaborative documents:** Tools where multiple students can work together.
- **Peer review and annotation:** Students giving feedback on each other's work.
- **VR/AR labs:** Virtual or augmented reality environments for hands-on practice.

Equity and Inclusion

Using a mix of teaching styles can help all students. Structured, direct methods can be especially helpful for beginners or students who are the first in their family to attend college, as they provide clear expectations and frequent feedback. More open-ended, collaborative projects can include students' personal experiences and cultural backgrounds, making learning more relevant (Ladson-Billings, 1995).

In online learning, it's crucial to make sure everyone can participate. This means:

- **Accessibility:** Providing things like closed captions and text that can be read by a screen reader.
- **Low-bandwidth options:** Making sure materials work on slow internet connections.
- **Flexible pacing:** Allowing students to learn at their own speed.

Finally, keeping students motivated and feeling like they belong is essential for success online. This can be done by giving students more control over their learning and by creating a strong sense of community (Deci & Ryan, 2000; Garrison et al., 2000).

Implications for Practice and Policy

1. **Align goals, guidance, and tasks.** Begin with explicit goals and success criteria; calibrate guidance to learner expertise; fade scaffolds as competence grows (Biggs, 1996; Kalyuga et al., 2003).
2. **Sequence for schema then transfer.** Use modeling and worked examples early; transition to authentic problems and collaborative inquiry (Mayer, 2009; Jonassen, 1999).
3. **Engineer effective practice.** Implement spaced retrieval, interleaving, and deliberate practice with immediate and elaborated feedback (Dunlosky et al., 2013; Hattie, 2009).
4. **Make thinking visible.** Use formative assessment techniques (exit tickets, think-alouds, peer review, learning journals) to surface understanding and adjust instruction (Black & Wiliam, 1998; Wiliam, 2011).
5. **Design for online presence and accessibility.** Employ CoI principles; ensure accessibility, low-bandwidth alternatives, and inclusive participation norms (Garrison et al., 2000; Clark & Mayer, 2016).
6. **Invest in teacher learning.** Professional development should model the blend: explicit strategy instruction plus collaborative design and reflection (Ambrose et al., 2010).
7. **Adopt evidence-informed technology.** Select tools that support both efficient practice (adaptive quizzing) and knowledge building (collaboration, annotation), with data to inform instruction.

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