

**LEARNING STYLES INVENTORY AND EXPERIENTIAL LEARNING THEORIES
AN INTEGRATIVE REVIEW OF LITERATURE**

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ABSTRACT

Kolb Learning Style Inventory (KLSI). Kolb's Learning Style Inventory (KLSI) and Kolb's Experiential Learning Model (ELT) theories are referenced in 55% of academic journal articles, 20% of doctoral dissertations, 10% of books and book chapters, and 15% of conference proceedings, research reports, and other studies of experiential learning. Despite its popularity and widespread use, the theoretical underpinnings of Kolb's theories are questioned. Others argue Kolb's approach for measuring the effectiveness of his theories as being "weak to moderate." However, the results of quantitative studies suggest ANOVA statistics documenting the interrater agreement between the use of Kolb's cyclical transformation learning techniques and cognitive achievement increases at a statistically significance Cohen's Kappa 0.003 reliability indicator. The purpose of this integrative literature review was to use Cooper's Taxonomy of Literature Review guidelines to gather and analyze works that studied the topic of inquiry. Of the 50 works analyzed, the findings of 19 studies were synthesized and implications were noted. The findings were used to present recommendations for additional studies. This study was significant because it infers additional valid, reliable, and scalable research is needed to resolve the conflicts and recommends several strategies to accomplish this goal.

Keywords: Experiential Learning Theory, Kolb Learning Style Inventory, Learning Style Theory

INTRODUCTION

On the 40th anniversary of the Simulation & Gaming interdisciplinary journal, Kolb and Kolb (2009) marked the wide application and contributions of their Kolb Learning Style Inventory (KLSI). Although there are numerous learning models, KLSI is the most popular and reference within the experiential learning domain (Saunders, 1997, p.99). Regardless, examinations of Kolb's theories and constructs revealed gaps in the literature and contradictions related to the reliability and validity of Kolb's theoretical underpinnings and measurability (Garner, 2002; Miettinen, 2000) and the rigor of his theoretical constructs questionable (Saunders, 1997).

Based on the premise that learners come in different sizes, shapes, and cultural backgrounds, several theories claim learners should be classified into theoretical learning styles or preferences (Dyrud, 1997). Kolb's Learning Style Inventory (KLSI) and Kolb's Experiential Learning Model (ELT) have been referenced in 55% of academic journal articles, 20% of doctoral dissertations, 10% of books and book chapters, and 15% of conference proceedings, research reports, and other studies of experiential learning (p. 298). Kolb's methods represent advanced instructional design approaches focused on the facilitation of germane cognitive load through the proper presentation of activity-oriented learning experiences. The theories are also advanced because the instructional strategies integrate both methods and tools that create measurable, holistic, and replicable learning experiences. The common belief is that using KLSI and ELT enable instructors to meet learners where they are using differentiated materials and approaches aligned with individual learner assumptions, feelings of self-efficacy, socioeconomic status or cultural boundaries (Kolb & Kolb, 2009).

KOLB'S LEARNING STYLES INVENTORY

Kolb and Kolb (2009) explain that individuals learn in particular and unique ways and argue that "learning is the major determinant of human development and how individuals learn shapes the course of their personal development" (p. 314). Based on this assumption, Kolb and Kolb theorized humans have four primary and individualized and differentiated learning styles as referenced in Figure 1.

Specifically, Kolb and Kolb explain experiencing learners that require direct “here and how” present moment experiences and sensations and feelings from concrete learning stimuli to develop interpersonal skills of leadership, relationship, giving and receiving and expression to learn; reflecting learners that require space and time and prefer still and quiet learning experiences that enable them to develop information skills such as sense-making, information gathering, and information analysis; thinking learners that prefer learning experiences that require practice at theoretical model building and the creation of action scenarios to build analytical skills including theory construction, quantitative data analysis, and technology enhancements; and action learners that prefer learning experiences that involve courageous initiatives, feedback, and monitoring of action-oriented goals and task completion skills (p. 319). Kolb and Kolb also theorized learners could be categorized into four types:

- (1) Observant, sensitive diverging learners that prefer innovative and imaginative concrete situations and instruction that enables them to make observations of a variety of perspectives during group interactions;
- (2) Insightful attentive assimilating learners that prefer instruction that requires inductive reasoning to complete projects or experiments to create models collaboratively;
- (3) Action-oriented converging learners that prefer instruction that requires thoughtfully applying technical concepts and practical application of ideas; and
- (4) Intuitive and thoughtful accommodating learners that prefer instruction that requires considerable and thoughtful planning before engagement (Kolb, 2014).

Based on these theories, Kolb & Kolb advise instructional designers should take care to include learning activities that accommodate both individualized learning preferences and styles into learning materials, and instructors should ensure materials are presented in a manner that meets the individualized needs of all learners (Kolb & Kolb, 2009).

KOLB'S CYCLICAL EXPERIENTIAL LEARNING MODEL

In addition to individualized learning styles and preferences, Kolb sought to define the creation of a process whereby knowledge is gained through critical reflections and the transformative learning process. Knowledge results from the combination of grasping and transforming learner experiences (p. 298). The result was the creation of Kolb's experiential learning model (ELT). ELT is grounded in the theory an "idealized learning spiral cycle designed to expose the learner to a complete meta-cognitive learning experience including experiencing, reflecting, thinking, and acting with a learning space" (Kolb & Kolb, 2009, p. 298-299).

The promotion of meta-cognitive knowledge building is the key component of ELT. The goal is to transform learners' feelings of self-efficacy and change their assumptions related to their ability to learn and their attitudes toward learning. This change in perspective frees learners to trust the process of learning instead of their habits of mind (p. 307). Kolb described this as the auto poetic life force, or a learning spiral, where enriched concrete learning experiences are broadened and deepened through critical reflections that confirm the learner is indeed learning and creating new meanings through their thoughts and actions. The learner can then progress through an iterative, recursive cycle using practice as reinforcement regarding their ability to learn and apply new skills (p. 309-314) (Enns, 1993; Kolb & Kolb, 2009, p. 319-320). However, despite noting its popularity and widespread use, the body of knowledge continues to debate Kolb's learning style theories and methodologies. Some research considers that, while humans may express a learning preference, the evidence does not support instructional strategies targeted toward individualized and differentiated learning preferences (Saunders, 1997).

METHODS AND PROCEDURES

An exhaustive with selection criteria integrative literature review was conducted between February and March 2019 had the purpose of performing a rigorous examination of literature supporting and contradicting Kolb's LSI. The purpose was to critically appraise and synthesize theories regarding the validity of individualized and differentiated learning styles from a broad range of perspectives. The research questions were: Does empirical evidence support the existence of individualized and differentiated learning styles? The

target audience is the international scholarly community of scholars interested in pedagogy, andragogy, and heuristics.

Cooper’s (1988) Taxonomy of Literature Reviews (Cooper, 1988) for exhaustive coverage with selection criteria was used as the framework Callahan’s (2010) guidelines for writing integrative literature to create research evidence for an audience of researchers, theorists, practitioners, and policymakers to consider during personal, practice and political decision-making purposes were used to structure the format. Five steps were completed. First, keywords were identified and used to search for literature related to Kolb’s Learning Styles Inventory or Experiential Learning Model. Second, a respected database was searched for works using previously established criteria. Third, literature abstracts were examined for relevance to the research question and to identify exclusions. Fourth, selected literature was weighted using a hierarchy to facilitate judgment regarding the quality of evidence using a statistical approach. Fifth, a systematic process was used to organize, synthesize, and prepare the findings of the review for publication, dissemination, and translation into practice after adoption as evidence. The University of North Texas (UNT) was the source of all literature reviewed. The Boolean keyword phrase, “David Kolb” was used to search for peer-reviewed articles published between 1979 and 2018 available through the Educational Resource Information Center (ERIC).

“David Kolb” Boolean Search Results

ERIC Articles selected and gathered	36
Articles searched by article citation	6
Articles excluded as inaccessible	3
Articles excluded as off-topic	3
Literature review guidance and structure	2
Total articles reviewed	50

The abstracts of the 50 articles were screened, and 36 works were selected and gathered for examination and synthesis. During the screenings, another 6 articles were gathered from citations, 3 articles with English titles were excluded for lack of access and 2

articles were excluded as off-topic. Seminal works by Cooper (1985) and Callahan (2010) used to provide guidance and structure for the review were gathered, but not analyzed. Additional seminal works were also reviewed because of their relevance. The works were downloaded and imported into NVIVO for coding. NVIVO helped identify and was used to organize the literature.

INTEGRATIVE LITERATURE ANALYSIS AND SYNTHESIS

The syntheses of the 15 works identified theories regarding both the strengths and weakness of Kolb's learning theories. The four seminal works were used to weight findings against theories accepted by the body of knowledge.

SYNTHESIZED THEORETICAL INFERENCES

Critics of Kolb's theories include Miettinen (2000) who wrote Kolb's initial works represents a special genre of "consultancy literature," and his motivation appeared to the construction of an "attractive collection of ideas" instead of critical evaluation or interdisciplinary premises that support his theories (p. 56). Miettinen questioned that Kolb's work was underpinned by foundational works by Lewin (p. 55). He also noted Kolb's inadequate interpretation of Dewey's theories about experimental thought and activity, separates Kolb's work from the theoretical and epistemological body of knowledge and adult education tradition (p. 70). Miettinen thereby warns the price for KLSI to adult education research is "high." The researcher argued that Kolb's LSI's lose connections to philosophical, anthropological, sociological, and psychological studies present a "risk" to adult education research.

Further, Miettinen argued a belief in individual learning capabilities leads the field away from the cultural and social conditions essential to fostering real life change and learning (Miettinen, 2000, p. 71) Garner (2002) also criticized the theoretical limitations of Kolb's Learning Style Inventory and disputed Kolb's methods are underpinned by Jung typologies (1977) and the Tyler (1978) theories in two ways. First, Garner contested Kolb's claims that the 70 correlations elements of Myers-Briggs Type Inventory mapped the connections between Jung's conception of types and styles (p. 341-342). He also argued, despite the statistically significant -0.42 correlation between 18 of the 70 elements Kolb

(p.63) provided as “evidence”, the implications were not “unpacked” to account for the approximate 20% score variances which made the level of significance indicated to be of no “practical use”. Miettinen explained that Jung felt “important experiences were based on connection to the collective unconscious, the archetypal primordial images from pagan times or to the species-historical primitive.” Further, Jung was said to have determined the psychological experience as an alternative to institutionalized religion (p. 60). Miettinen wrote because Kolb uses an epistemology different from Jung (p. 343) and argued Kolb’s “fixed learning styles” lack the flexibility required Tyler’s “possibility processing”. Therefore, in conclusion, Garner determined Kolb’s theoretical connections to be weak with contradictions and “seriously flawed.” (p. 347). Saunders (1997) appears to concur by rating KLSI as “weak to moderate” for delivering concrete experiential learning experiences and “moderate” for supporting reflective observations and active experimentation (p. 104).

SYNTHESIZE QUALITATIVE AND QUANTITATIVE INFERENCES

By contrast, however, qualitative studies have noted the effectiveness of Kolb’s theories and approaches. Kreber (2001) noted that Kolb’s theories support previous assumptions that action learning can have a profound impact on learning outcomes (Kreber, 2001, p. 217). Healey and Jenkins (2000) argued Kolb’s theories offer a “valid and plausible” experiential learning framework (p. 185) and a comprehensive approach to lifelong education and learning underpinned by Dewey and Lewin (p. 187). Other researchers noted empirical evidence that measured degrees of predominant learning styles in both the sciences and humanities disciplines (Healey & Jenkins, 2000, p. 190). Terry (2001) proclaims Kolb’s methods are psychometrically reliable (p. 2) but doubts Kolb’s claims that differences in people’s learning styles can be measured reliably or tailored (p. 3). However, other works within the body of knowledge have documented the effectiveness of Kolb’s theories and models during experimental studies (Burge, 1996, p. 844). Sims, Veres, and Heninger (1989) suggested Kolb’s theories guide the online learning design and implementation processes by outlining specific competencies and skills outcomes Brock and Cameron (1999) found Kolb’s methods effective for teaching political science because of reflective observation (RO) that enables learners to “make sense” of their life concrete experiences from different perspectives. Brock & Cameron also explained that RO promotes “patience, objectivity, careful judgment, and observations” which helps learners “break”

experiences into parts and stages of learning (Brock & Cameron, 1999, p. 251). Other research documented Kolb's methods facilitate classroom and group learning, particularly in higher education (Farrar-Myers & Dunn, Raby, 2014; Terry, 2001, p. 6-7). Earlier case studies by Andrews (1990) and Klavas (1994) in North Carolina and a case study by Lemmon (1985) found similar results to Dunn and Dunn's learning style program which documented improved student's attitudes, work habits, and behaviors using Kolb's methods. Dille and Mezack (1991) also found correlations between the use of Kolb's methods and undergraduate student learning preferences. Raschick, Maypole, and Day (1998) found correlations between the use of Kolb's methods and increased learner satisfaction (Farrar-Myers & Dunn, 2010; Terry, 2001, p. 4). Similarly, Baker and Robinson (2012) synthesized literature and found the use Kolb's cyclical experiential learning model during agricultural education allow teachers to "gently guide" students effectively during ELT activities (p. 8-10). Quantitative studies have also supported Kolb's theories and documented positive correlations to improve learning outcomes. Mainemelis, Boyatzis, and Kolb (2002) found a statistically significant correlation between balanced learning styles and cumulative grade point averages. Mainemelis, Boyatzis, and Kolb (2002, p. 9) also cited a study that found teams balanced by learning style performed significantly better than cohorts. Botsios, Georgiou, and Safouris (2008, p. 336-337) found "strong evidence" that different learning style groupings are both important and necessary in the Adaptive Educational Hypermedia Systems (AEHS) studies in educational settings. Likewise, Ethridge and Branscomb (2008) documented the reliability of Kolb's cyclical model to create effective transformation learning experiences at Cohen's Kappa of 0.91. Cohen's kappa is a statistical measure that measures the agreement between various investigators regarding the correlation between qualitative coefficients. Measures of Cohen's Kappa between 0.81 and 0.99 indicate a perfect agreement and that the coefficient correlation does not occur by chance (p. 402). Finally, Sudria, Redhana, Kirna, and Aini (2018) examined the effect of Kolb's methods on chemical learning activities and achievements by conducting a comparative study 337 11th grader enrolled in Bali, Indonesia science classes. The ANOVA post-test was used to determine 21 learners preferred diverger-based (17.5%), 36 preferred assimilator-based (30%) approaches, 43 preferred converger-based (35.8%), and 20 preferred accommodator-based (16.7%) instructional approaches (Sudria, Redhana, Kirna, & Aini, 2018, p. 94-99).

IMPLICATIONS

The examination of literature appears to confirm the conflicts and contrasts within the body of knowledge related to the validity, strengths, weaknesses, and reliability of Kolb's learning style inventory and cyclical experimental learning theory. The controversies persist despite the popularity and wide use of Kolb's theories and methods and despite empirical studies that have documented the improvements in learning outcomes when Kolb's methods are used in educational and professional development settings.

CONCLUSIONS

The rapid growth in demand for advanced online instructional design (ID) models created the need for an examination of the literature that studied the use of Kolb's Learning Style Inventory and experiential learning model instructional approaches to improve student learning outcomes. An integrative literature review was conducted between February and March 2019 to answer the questions: Does the empirical evidence support the existence of individualized and differentiated learning styles? The literature review confirmed that, despite evidence to the contrary, members of the body of knowledge, have not embraced Kolb's Learning Style Inventory or Experiential Learning Theory models has generated effective, valid, or measurable outcomes.

RECOMMENDATIONS

It is recommended that a meta-analysis be conducted to examine Kolb's methods at the macro broad conceptual online framework level, the meso management and infrastructure level, and the micro-teaching and learning levels (Guri-Rosenblit & Gros, 2011) to further examine this issue. Also, it is recommended that a random control trial (RCT) be conducted to assess the effectiveness of Kolb's learning theories within diverse settings and among diverse populations. In addition, it is proposed that a random control trial (RCT) would resolve conflicts related to the appropriateness and effectiveness of the Kolb ELT model. The RTC design should specify that a stratified generalizable representative target population sampling of significant participants be recruited from diverse adult learning populations including nonprofit community programs, colleges and universities, and for-profit training vendors. The sampling should be separated and assigned into control and two or more

treatment groups. The treatment groups should receive variations of blended Kolb's LSI and experiential learning model treatment interventions or placebos. After treatment, various outcome measures should be used to evaluate the effect of the interventions. As stated earlier, the systematic literature review was designed to answer a research question related to the validity and reliability of strategies focused on instruction according to differentiated learning styles. The two proposed future research should effectively answer that question and others regarding Kolb's work and applications at the broad conceptual online framework, management, organization, technological, and online teaching and learning processes levels.

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