

# Active and Transformative Learning in STEAM Disciplines

From Curriculum Design to Social Impact



VOLUME & SERIES EDITOR

**Miltiadis D. Lytras**

# **Active and Transformative Learning in STEAM Disciplines**

# **Emerald Studies in Active and Transformative Learning in Higher Education**

**Series Editor: Miltiadis D. Lytras, Effat College of Engineering, Effat University, Saudi Arabia**

Filling a significant gap in the body of knowledge related to the emerging agenda of active and transformative learning strategies, *Emerald Studies in Active and Transformative Learning in Higher Education* is a helpful resource for policy-makers, curriculum designers and school leaders aiming to develop value-based strategies for promoting quality education with an emphasis on active and transformative learning techniques.

# **Active and Transformative Learning in STEAM Disciplines: From Curriculum Design to Social Impact**

EDITED BY

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United Kingdom – North America – Japan – India – Malaysia – China

Emerald Publishing Limited  
Emerald Publishing, Floor 5, Northspring, 21-23 Wellington Street, Leeds LS1 4DL

First edition 2024

Editorial matter and selection © 2024 Miltiadis D. Lytras.  
Individual chapters © 2024 The authors.  
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**British Library Cataloguing in Publication Data**

A catalogue record for this book is available from the British Library

ISBN: 978-1-83753-619-1 (Print)

ISBN: 978-1-83753-618-4 (Online)

ISBN: 978-1-83753-620-7 (Epub)



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# Acknowledgment

In this Inaugural Volume of the *Emerald Studies in Active and Transformative Learning in Higher Education*, we tried to provide a working context for a new ATL paradigm in higher education. We have already planned three new volumes for the next year. We want to thank from heart all the contributors for their top-quality contributions and for their commitment to the ATL vision in higher education for a better world based on top-quality education for all.

Heartfelt thank you and appreciation also to our excellent Publishers in Emerald and our officers, Kirsty Woods and Lydia Cutmore for their professionalism, commitment, and hard work for moving this publication forward. It is an honor to work with Kirsty and Lydia.

Also, this book wouldn't be possible without the great contribution and professionalism from our content development supervisor Dheebika.

Last but not least I want to help all my students for our unique relationship over the years.

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# Introduction: Active and Transformative Learning (ATL) as a New Higher Educational Paradigm

*Miltiadis D. Lytras*

## 1. The Determinants of Our Active and Transformative Learning Paradigm

Higher education really needs a new holistic paradigm for strategic value delivery. It seems that constantly higher education institutions are struggling in rigid structures and slow-moving bureaucratic procedures. In parallel, the society, the economy, the industry, and other stakeholders consider higher education as a trusted partner in their unique value propositions.

A new era of skills and competencies for the next-generation professionals and jobs has already started. The universities and colleges have to recognize this reality and must adopt flexible structures and bold strategies to support this development.

In parallel, the industry is looking for sustainable solutions to bold problems, and is promoting a huge, rapid transfer of know-how based on scientific and research evidence to services and products to meet the needs of current markets or to launch brand new markets.

Entrepreneurship seems to be a bold response for the utilization of innovative business models that bring value to the market and mobilize human capital in socially inclusive economic growth.

Research and development capacity and innovation are orchestrating new generations of innovations and robust and resilient value propositions based on technology-driven digital transformation.

In [Fig. 1](#), we provide our own perception for the pivotal role of the active and transformative learning paradigm.

Active and transformative learning has according to our unique value proposition has seven bold value components ([Fig. 2](#)):

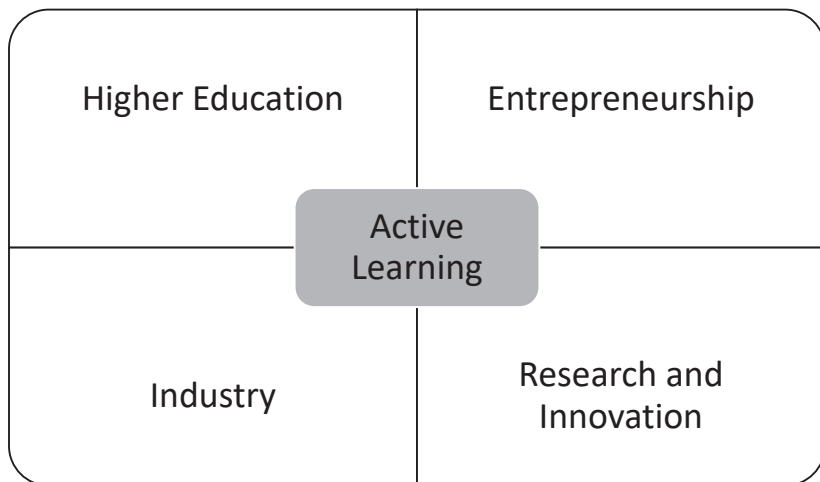


Fig. 1. Active and Transformative Paradigm in Higher Education in Times of Change. *Source:* The author.

- Knowledge and content
- Learning strategies
- Technology enhanced learning enhancement
- Skills and competencies uniqueness
- Faculty capacity to implement
- Administrative support and educational leadership
- Impact measurement and learning analytics

## 2. The Contents of This Volume

The inaugural volume of our book series is organized into 14 chapters as follows:

Chapter 1: Active and Transformative Learning (ATL) in Higher Education in Times of Artificial Intelligence and Chat GPT: Investigating a New Value-Based Framework

Chapter 2: Educational Sustainability for Transforming Education: A New Approach of Active Learning in an Interdisciplinary Program in Higher Education

Chapter 3: Transformative Active Learning in the Saudi National Institute of Health: Promoting Education and Research Skills Capability

Chapter 4: Practical Applicability of Active Learning Strategies for Stimulating Engagement among Economics Students: The Post-Pandemic Outlook



Fig. 2. Active and Transformative Learning Core Components in Higher Education in Times of Change. *Source:* The author.

Chapter 5: Historic Learning Analytics Transforming Learning in Saudi Arabian Higher Education

Chapter 6: From Passive to Active Learning: The Transformative Power of Writing in Higher Education

Chapter 7: Transformative Learning Strategies for Successful Teaching and Learning in the Transforming Higher Education

Chapter 8: Innovative Hybrid Learning: A New Paradigm in Teacher Education for Transformative Learning

Chapter 9: How a Hybrid Education Model Can Support the COVID-19 Sanitary Emergency Based on Information and Communication Technologies

Chapter 10: Adopting HyFlex Course Design: Actions for Policymakers, Researchers, and Practitioners

Chapter 11: Blended Learning as the Baseline for Post-COVID-19 Higher Education

Chapter 12: Seeking Motivation for the Success of Active Learning

Chapter 13: Implementation of a High School Equivalency Policy in an Active Learning Environment: A Case Study of US-Curriculum School in the United Arab Emirates

Chapter 14: An Integrated Transformative Learning Strategy at National Level: Bold Initiatives Towards Vision 2030 in Saudi Arabia

## Chapter 1

# **Active and Transformative Learning (ATL) in Higher Education in Times of Artificial Intelligence and ChatGPT: Investigating a New Value-Based Framework**

*Miltiadis D. Lytras*

### **Abstract**

Active and transformative learning (ATL) challenges the new era of teaching and learning in higher education. In this chapter a systematic approach to ATL theories and methodologies is provided. Authors provide a unique methodological framework for the integration of active learning practices in modern higher education curricula. This chapter also provides an integrated context for the overall discussion of the phenomenon in the volume. The recent arrivals of new disruptive artificial intelligence-enabled technologies such as OpenAI, ChatGPT, DeepAI and others are only few aspects of a new challenging era for the teaching, learning, innovation and sustainability in the higher education.

*Keywords:* Active learning; transformative learning; higher education; learning strategies; ChatGPT; digital transformation; research & development

## **1. Introduction – The Higher Education in Times of Fast and Disruptive Changes**

The learning effectiveness in higher education is an overarching educational strategy. In the last years the evolution of technology and the enriched socio-technical and economic environment of the students has posed significant pressures to the rigid, monolithic approach of higher education institutions that one-size-fits-all in the course design, implementation and delivery (Lytras & De Pablos, 2009; Lytras, Naeve, & Pouloudi, 2005; Naeve, Sicilia, & Lytras, 2008; Zhuhadar, Yang, & Lytras, 2013). In this direction the higher education institutions have to not only recognize

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Active and Transformative Learning in STEAM Disciplines, 5–23

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doi:[10.1108/978-1-83753-618-420231001](https://doi.org/10.1108/978-1-83753-618-420231001)

the challenges in the job market but also understand the necessity for a new, robust, learning and teaching strategy that is capable of delivering the required skills and competencies. Jointly in the same strategic orientation, the new action plans in the higher education have to incorporate novel learning and teaching philosophies far away from the static-content, monolithic approaches (Alkhaldi, 2022; AI-Youbi et al., 2020; Arafat, Aljohani, Abbasi, Hussain, & Lytras, 2019; Lytras, Aljohani, Visvizi, Ordonez De Pablos, & Gasevic, 2018; Lytras, Damiani, & Mathkour, 2016; Lytras & Mathkour, 2017; Lytras, Raghavan, & Damiani, 2017; Lytras, Visvizi, Damiani, & Mthkour, 2018; Lytras, Visvizi, Daniela, Sarirete, & Ordonez De Pablos, 2018; Zhang, Jiang, Ordonez de Pablos, Lytras, & Sun, 2017; Zhang et al., 2017).

Times have changed significantly. The huge agora of higher education and the complementary marketplace of professional certification provides nowadays a plethora of options and opportunities for potential students, learners and professionals. The industry also is redirecting the skillset and the competencies required for a successful career to mechanisms that promote focused transfer of expertise and lifelong learning professional development activities. Also, with its capacity to recognize far in advance the new required job profiles, the industry always poses critical pressure to higher education for rapid and meaningful revisions of educational curricula. The quest of sustainable economic development attached directly higher education objectives to robust innovation and developmental entrepreneurship. In other words, the creative capability of young students together with the evolution of the technological and systemic body of knowledge in all the disciplines sets a very demanding integrative workflow: New ideas, most of the times technology-enhanced, justify real words services and products with knowledge intensive components, where the humans and especially young people are the carriers of innovation.

The financing also of the higher education and the increasing demand for new high-quality training and educational programs, requires new modes for the delivery of learning content. In simple words personalization and dynamic composition of learning modules on demand is a high priority. In this direction active and transformative learning can serve a new era of new business and new educational models for the higher education aiming to cover a long-term demand of individuals and groups for elevation of their knowledge, skills and capacities.

One more significant dimension of the change and the disruption in the context of the higher education is related to the competition and the readiness of the higher education institutions to develop robust, resilient pathways of learning accomplishments that will reward learners with timely knowledge, updated skills and increased employability. In times of change the ability of learners to learn more effectively seems to be the most challenging capacity to be delivered by universities and colleges.

Active and transformative learning (ATL) is a bold response and an integrated strategy for managing the complexity and the new demands in higher education. It provides an overarching principle for the core educational and learning component that utilizes the value delivery of the synchronization of academia, industry, innovation, entrepreneurship and research components.

In Fig. 1, we provide an overview of the basic abstraction of our unique value proposition for the integral system of value components that set the value for active and transformative learning in higher education.

ATL, according to our unique value proposition, has five bold value components (see Fig. 2):

- Knowledge and content
- Learning strategies
- Technology-enhanced learning
- Skills and competencies uniqueness
- Faculty capacity to implement
- Administrative support
- Impact measurement
- Learning analytics

This list of core components it is not exhaustive provides though a 360 degrees perspective to the diverse and integrated aspects of active learning, that need systematic strategies for their exploitation in modern universities and colleges.

Active learning is about utilizing knowledge and content. In an era of open educational resources and open access/open learning movement, the integration of diverse learning objects or content modules including microcontents seems like an art. New approaches for the dynamic composition of learning contents have updated the best practices of the previous decade.

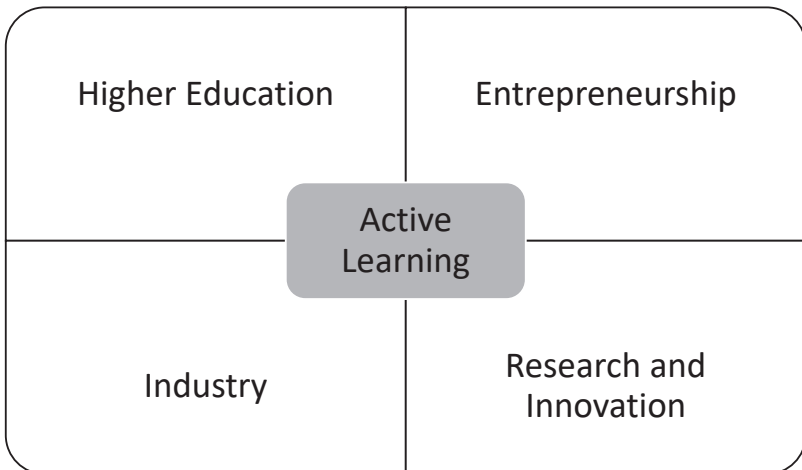


Fig. 1. Active and Transformative Learning System in Higher Education in Times of Change. *Source:* The author.



Fig. 2. Active and Transformative Learning Core Components in Higher Education in Times of Change. *Source:* The author.

In Section 3 of this chapter we provide more detailed discussion for these value components.

## 2. Active and Transformative Learning System in Higher Education

The adoption of active learning strategies in higher education requires first of all a detailed description of the value context. In the previous section we introduced the idea of the ATL system. We use this high-level abstraction in order to support our argumentation with some characteristic statements and clarification. The value-based approach to ATL in higher education needs a system backbone in order to justify and adopt learning strategies that will multiply the synergies of the core system components presented in the previous section.