TECH-KNOWLEDGY: DEVELOPING A PENDULUM MODEL OF PEDAGOGY AND ANDRAGOGY IN VIRTUAL LEARNING ENVIRONMENT FRAMEWORK (VLEF)

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ABSTRACT

The science of teaching children is pedagogy and the art of enabling adults to learn at their own is andragogy as revealed in the literature on the subject. The era of Information and Communication Technology in the 21st century has created a pendulum of pedagogy and andragogy due to paradigm shift from pedagogical teaching model to andragogical self-regulated, continuous and life-long learning in virtual learning environments and open and flexible educational institution. This new paradigm resulted in pedagogical innovations and andragogical practices.

The purpose of the study was to develop a model for innovations in teaching and learning through open and flexible Virtual Learning Environment Frameworks (VLEF) in educational institutions. The objective of the study was to move on the continuum from pedagogy to andragogy by using ICTs tools and resources and developing knowledge iterative cycle as discussed by the author in (ICOFE, 2014) and (ICRA, 2015) that was published by David Publishing Company in 2015.

The methodology of the study was literature review and critical discourse analysis for developing conceptual framework and analyzing various teaching models, strategies and instructional designs in educational technologies use and practices.

The findings of the analyzed data revealed that knowledge is dynamically created and iteratively developed through the use of ICTs in teaching learning process. The motion of a person from information or knowledge (mean) to application or wisdom (extreme) is just like a pendulum.

So, the researcher concluded that tech-knowledgy model is analogous to the pendulum model of pedagogy and andragogy in Virtual Learning Environment Framework (VLEF)

Keywords:

- Pedagogy
- Andragogy
- Tech-knowledgy
- Virtual Learning Environment Framework (VLEF)
- ICT-use
- Knowledge / Epistemology
- Pedagogical innovations
- Andragogical practices
- Pendulum model

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INTRODUCTION

When we move from Pedagogy towards Andragogy by using ICT tools and resources a pendulum is created because the development of knowledge from lower level information to higher level wisdom (author, 2014) is spirally and result in iteration of higher order wisdom in e-learning and Virtual Learning Environment Framework (VLEF).

Papas (2015) has discussed pedagogy Vs andragogy in e-learning design for instruction and concluded that children and adult requires different instructional design in e-learning as the requirements of children learning are different from adults. However, due to the concepts formation strategies and conceptual development models as discussed by Jean Piaget and Bruner; there is need of sequence and time (scheduling) for each concept to be developed from lower level information (doubt) to higher level (certainty and clarity).

Moreover, there is need of an art for designing instruction and science of presentation and development of the lesson for both children and adults due to differences in their mental and psychical maturities; using pedagogy; and the art of enabling adults to learn at their own using andragogy; as revealed in the literature on the subject.

In conclusion to the above; we can say that pedagogy is teacher centered learning and instructional designs and strategies while andragogy is student centered learning and instructional designs and strategies. But, both cannot be separated for instruction and teaching of a given concept or skill in a subject or discipline.

STATEMENT OF THE PROBLEM

The purpose of the study was to bring innovations in teaching and instruction in Virtual Learning Environment Framework (VLEF).

OBJECTIVE OF THE STUDY

The objective of the study was: Tech-knowledgy: Developing a pendulum model of pedagogy and andragogy in Virtual Learning Environment Framework (VLEF); to move on the continuum of pedagogy and andragogy when iteratively developing knowledge to wisdom by using ICT tools, resources and technologies.

METHODOLOGY OF THE STUDY

The nature of the study was historical and qualitative. So, the researcher used literature review and Critical Discourse Analysis for developing conceptual framework and analyzed various teaching models, strategies and instructional designs in educational technology use and practice.

LITERATURE REVIEW: ANALYSIS OF TEACHING MODELS AND STRATEGIES

According to Duncan (1981) as cited in Rashid (2010): there are two types of teaching models: Historical and Psychological:

- The Historical Teaching Models includes:
  - The Socrates Teaching Model
  - The Classical Humanistic Model
  - The Personal Development Model
- The Psychological Model of Teaching has four types:
  - Glaser's Basic Teaching Model (1962): Classroom Meeting Model
  - Computer Based Teaching Model: Programmed Instruction (Skinnerian Model)
  - A Teaching Model of School Learning (Piaget & Brunner Models)
  - Interactive Teaching Model (Flander's Model)

According to Smith (1983) there are two types of Philosophical Teaching Models:

  - The Impressional Model (John Locke)
  - The Insight Model (Plato)
  - The Rule Model (Kant)

According to Habeden (1980) as cited in Rashid (2010): there are four types of Educational Models which enables the student-teacher to make their teaching effective.

  - Taba's Model of Teaching
  - Turner's Model of Teaching
  - A Model of Variation in Teacher Education
  - Fort Lipitt's Model

If we analyze all the models of teaching and instruction there are common basic elements that guide a teacher-student and instructor in achieving the instructional objective and educational goals of a subject or discipline.

The Glaser's Basic Teaching Model (1962) consists of four elements: Instructional Objectives, Entry Behavior, Instructional Procedure and Performance Assessment while the Herbartian Model has focus "syntax"; preparation and presentation, comparison and abstraction, association and generalization as Herbartian steps for instruction and pedagogy.

It has a "social system" as authorities, "support system" as books and literature with an "evaluation system" to focus recall, recognition and retention: the basic components of memory and thinking.

Morrison et al (1969); who were the proponents of teaching models focus on developing mastery over the content and to provide substantial knowledge of the subject matter. The steps include: Exploration, Presentation, Assimilation, Organization and Recitation. In "social system" the teacher behavior is not autoreactic but democratic. In "support system" the Audio-Visual Aids can be used while the "evaluation system" consists of different types of testing: objective and subjective.

Bigge & Hunt (1974) as cited in Rashid (2010): defined the reflective level teaching as careful and critical examination of an idea in the light of testable evidence that support it. Hunt (1974) as cited in Rashid (2010): model present focus on Problem Solving, Independent Thinking, Critical Outlook and developing attitudes and beliefs.

There are two types of approaches to personal problematic situation:

- Dewy's Problematic Situation, and
- Kurt Lewin's Problematic Situation

The Dewy's Problematic Situation is used in "Forked Path Situation" when the person is learning two equally attractive material and the person is learning in achieving these goals. While Kurt Lewin (2007) assumes that the individual lives in the environment and he tries to adjust in that (life space). There are physical environment, social consumers and psychological (pulls and pushes) in environment for individuals.

In the "social system" the teacher should be corrective and tactful and there is democratic environment. The learner is active participant in the learning situation. In the "support system" there is already existing literature and the other social and education

sources to help in knowledge development. While the "evaluation system" includes Viva Voce besides objective and subjective testing.

Hence, we conclude that in any teaching model there is a focus (syntax), social system, support system and evaluation system as its basic elements to plan a lesson or instruction in these models. So, while teaching in Virtual Learning Environment Framework (VLEF) for developing tech-knowledgy; these elements must be considered; inorder to teach, adjust and plan instruction according to students' needs and content level of difficulty.

Planning is required for maximum utilization of resources in effective and efficient manner. So, the teaching is planned for maximum utilization of educational resources and getting the instructional objective, educational aims and goals.

Gagne (1989) nine events of instruction can be used effectively to plan and design lesson through both pedagogy and andragogy in e-learning or Virtual Learning Environment Framework (VLEF). The steps include: Gain attention, inform learner of objectives, simulating recall of prior learning, present the content, provide learning guidance, Elicit performance, provide feedback, assess performance and enhance retention and transfer to the job or other content (Wolfolk, 2004).

Hence, we can say that Gagne's nine events of instruction are best for using as teaching model or instructional design strategy in tech-knowledgy. The adult learning theory-andragogy was presented by Malcolm Shepard Knowles (1913 – 1997) according to Wikipedia (2017) and he has termed andragogy as synonymous to adult learning. He has given principles of adult learning that include:

- Adults must want to learn (intrinsic motivation)
- Adults will learn only when they feel there is need to learn (learning is need-based and contextualized)
- Adults learn by doing (Behavioristic engagement and active involvement)
- Adults learning focuses on problem solving (cognitive and constructive approach)
- Experiences effects adult learning (influence of previous or prior learning i.e. ZPD is considered)
- Adults learn best in informal situation (when there is use of ICT or non-ICT tools and interaction as well as communication)
- Adults wants guidance and consideration as equal partners in the learning process (simulation and modeling as well as scaffolding)

According to www.ispringsolution.com: Andragogy i.e. adult learning theory is important in that it clearly outline the differences in learning characteristics between children and adults. So, it seems that it is particularly useful to authors of e-learning modules.

The author (2014) has discussed Cognitive Apprenticeships as an effective pedagogy for enabling students to use toolkits in Virtual Learning Environment Framework (VLEF). Collen et al (1989) has proposed Cognitive Apprenticeships model consisting of six major steps in instruction and teaching: Modeling, Coaching, Scaffolding, Articulation, Reflection and Exploration. Liu (2004) has discussed web-based cognitive apprenticeships model having three phases for pre-service teaching training program: Modeling-Observing, Scaffolding-Practicing and Guide-Generalizing.

Collins et al (1991) have discussed four processes of traditional model of apprenticeships that include: Modeling (initiation), Scaffolding (support and guidance), Fading (withdrawing support gradually); and Coaching (developing and guiding by masters and experts).

Cognitive Apprenticeships is based on Vygotsky's (1978) research and is also related to other conventional apprenticeships; where master of a skill demonstrate and model that skill to an immature learner and thus developing that skill gradually by withdrawing the support and the learner become expert in that skill as well as become self-regulated learner to advance the skill and competence by using andrological methods independently.

The researcher (author) in his paper presented in ICORE IER (2016) has discussed Advanced Cognitive Apprenticeships in which the step of "creativity" is included after exploration. Thus, the Advanced Cognitive Apprenticeships can be used as best methods of instruction in e-learning, traditional learning, blended learning, as well as in Virtual Learning Environment Framework (VLEF) i.e. Open and Flexible Institutions.

FINDINGS AND DISCUSSION

While using advanced cognitive apprenticeships model in Virtual Learning Environment Framework (VLEF) there is development and use of both pedagogy and andragogy in the form of a pendulum just as a pendulum moves back and forth to complete vibrations in simple Harmonic Motion and a wave-form is resulted. In the same analogy while using advanced cognitive apprenticeships a wave of knowledge and concept or skill development will be produced as a result of vibratory motion from the extreme of pedagogy on one hand to the extreme of andragogy on the other. The mean position in this vibration

will be Zone of Proximal Development (ZPD) or existing knowledge of the individual learner as discussed by Vygotsky (1978) in his theory of social constructivism. So, the theoretical base of advanced cognitive apprenticeship is constructivism (individual, social and communal) for contextualization of learning in a community of practice by using the modern tools, technologies, sources and resources of ICT and Computer Assisted Learning Programs and Software Applications.

CONCLUSION

From the above discussion and findings we conclude that Tech-knowledgy model is analogous to the pendulum model of pedagogy and andragogy in Virtual Learning Environment Framework (VLEF). This model is discussed below and presented in Figures (1 – 4).

When using this new model in Open and Flexible Virtual Learning Environment Framework (VLEF) in educational institutions; we can develop the knowledge and skill of the individual from basic level (concept) to higher level (wisdom and creativity) through iterative cycles in a subject and discipline as discussed by the author in (ICOFE 2014) and (ICRA 2015) and the researcher paper published in The Journal of Mathematics and System Sciences (2015) by David Publishing Company, USA.
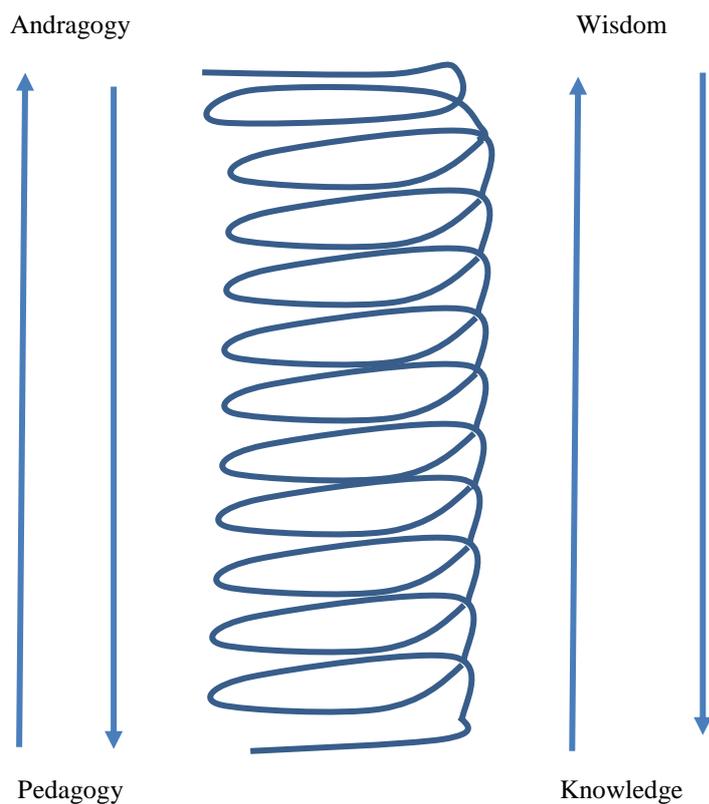
The pendulum model of instruction is as given below:

Pedagogy (Knowledge / Concept)   ZPD of the Learning (Mean)   Andragogy (Wisdom / Creativity)
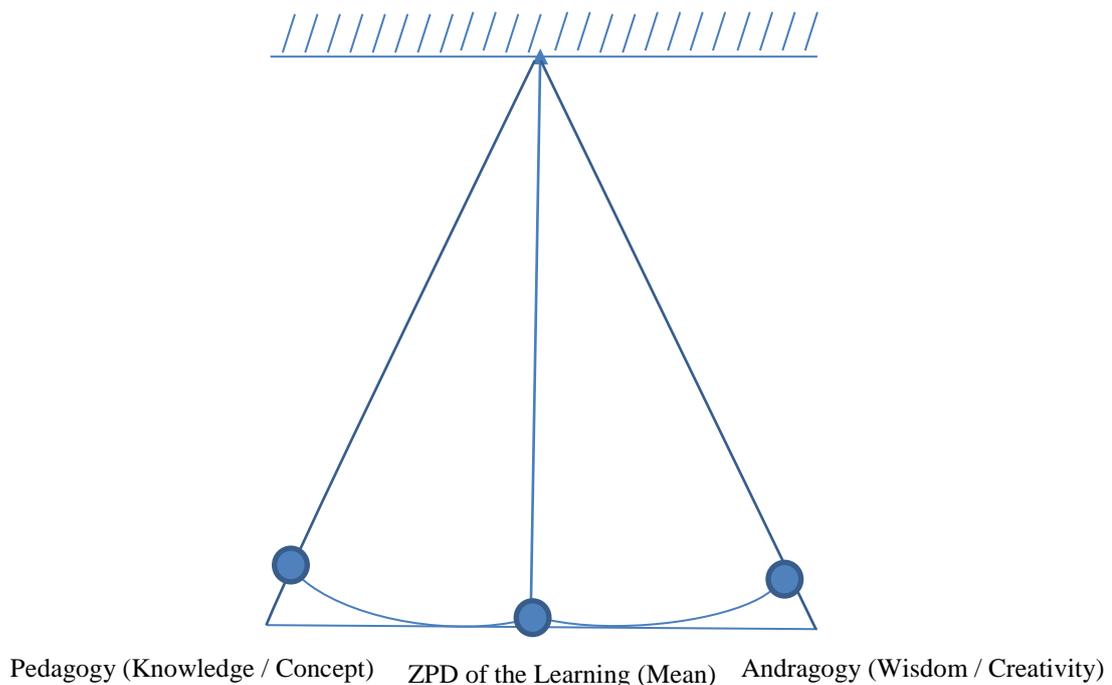
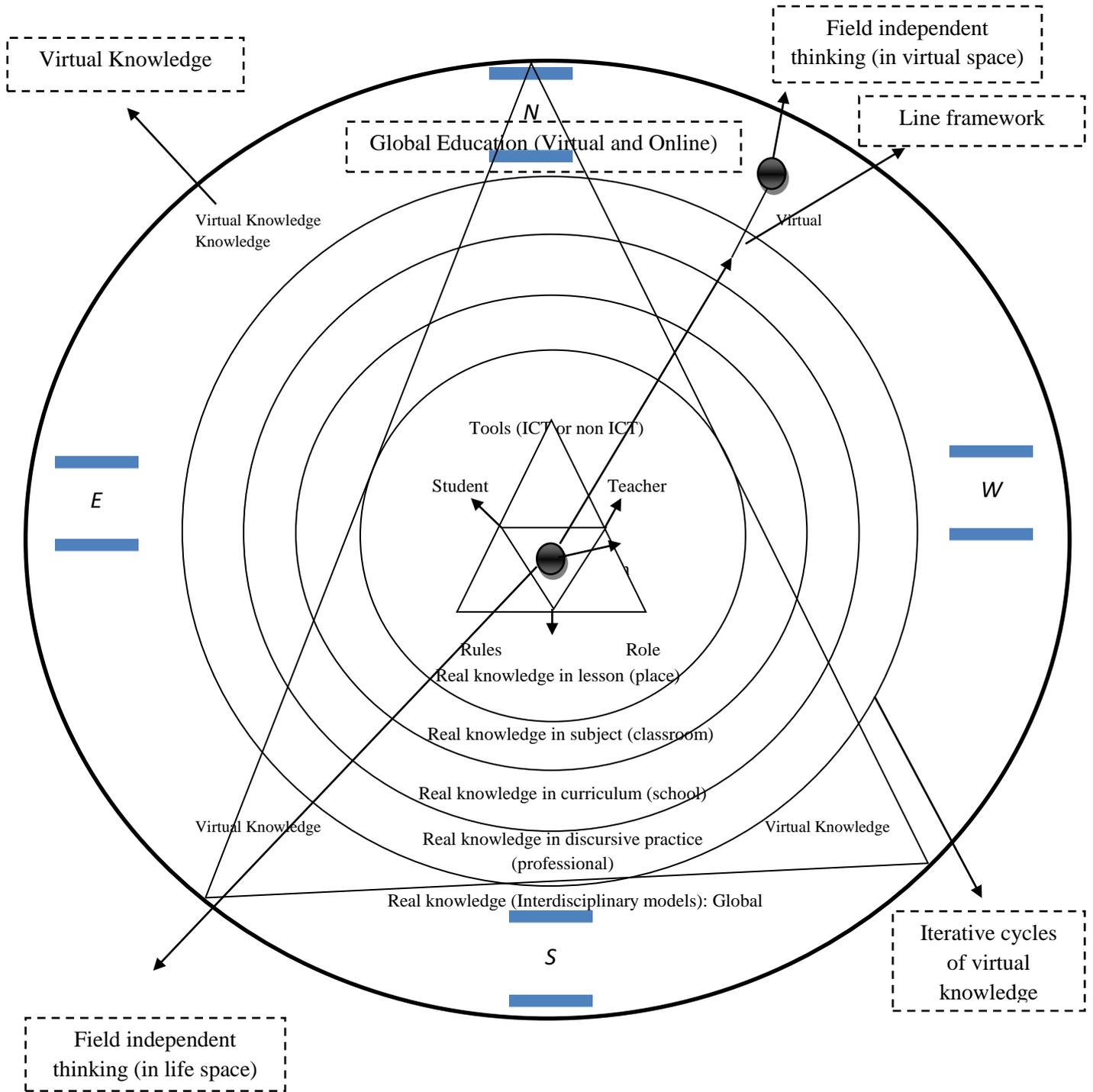**Figure 1: Pendulum of Pedagogy and Andragogy**
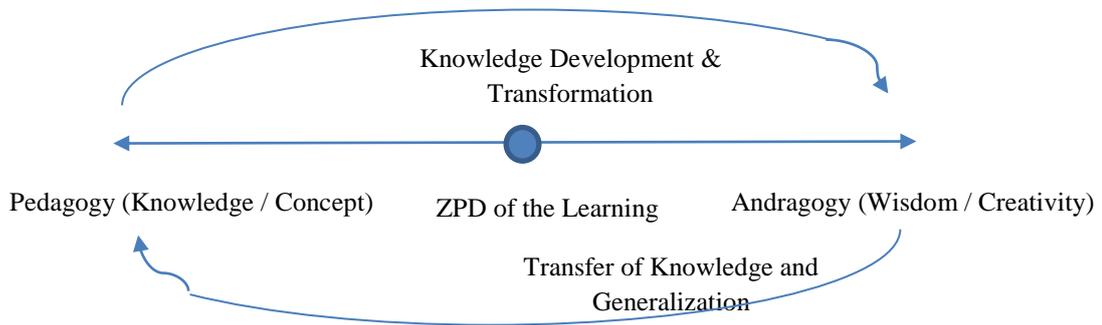
Figure 2: Continuum of Pedagogy and Andragogy to develop knowledge to wisdom

Figure 3: Spiral development of knowledge to wisdom as well as pedagogy to andragogy

Virtual Learning Environment Framework (VLEF) : A Theoretical Relativistic Framework

Virtual Knowledge

Field independent thinking (in virtual space)

Line framework

N

Global Education (Virtual and Online)

Virtual Knowledge Knowledge

Virtual

E

W

Tools (ICT or non ICT)

Student

Teacher

Rules

Role

Real knowledge in lesson (place)

Real knowledge in subject (classroom)

Real knowledge in curriculum (school)

Real knowledge in discursive practice (professional)

Virtual Knowledge

Virtual Knowledge

Real knowledge (Interdisciplinary models): Global

S

Iterative cycles of virtual knowledge

Field independent thinking (in life space)

Figure 4: Iterative cycles from knowledge to wisdom

RECOMMENDATION

On the basis of findings and conclusion the researcher recommended that the pendulum of pedagogy and andragogy be used in Virtual Learning Environment Framework (VLEF) to make the institution and learning efficient and effective.

FURTHER RESEARCH

The researcher suggested that when the pendulum of pedagogy and andragogy is swinging it will create iterative cycles of knowledge development. Hence, transformational learning model of teaching and instruction is needed to be explored in the next paper.

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