Cognition And Distance Education

The Coronavirus(COVID-19) pandemic has resulted in shutting down educational institutions all across the world. Consequently, education has changed dramatically, with a distinctive rise in distance education. The term “distance” education was there in existence well before the pandemic, but now due to “social distancing”, it is becoming more and more go-to tool for educational systems to go with.

Now, before looking at distance education (online learning), we will go through some terminologies of it.
The online learning can be divided into two subdivisions -

1) **Synchronous Online Learning**

Synchronous learning is the kind of learning that happens in real-time. This means that you, your classmates, and your instructor interact in a specific virtual place, through a specific online medium, at a specific time. In other words, it’s not exactly anywhere, anyhow, anytime. Methods of synchronous online learning include video conferencing, teleconferencing, live chatting, and live-streaming lectures.

2) **Asynchronous Online Learning**

Asynchronous learning happens on your schedule. While your course of study, instructor or degree program will provide materials for reading, lectures for viewing, assignments for completing, and exams for evaluation, you have the ability to access and satisfy these requirements within a flexible time frame. Methods of asynchronous online learning include self-guided lesson modules, streaming video content, virtual libraries, posted lecture notes, and exchanges across discussion boards or social media platforms.

D. Randy Garrison and Martha Cleveland-Innes stated in their research on "Facilitating Cognitive Presence in Online Learning" that the Interaction is not enough.

Moore (1989, 1990), the first one to focus on interaction issues in distance education, identified transactional distance as consisting of dialogue (i.e. interaction) and structure (i.e. design). He expanded on a dialogue variable and defined three core types of interaction:

1) Learner-Teacher
2) Learner-Content
3) Learner-Learner

An interactive community of learners is generally considered the "sine qua non" of higher education. However, interaction is not a guarantee that students are cognitively engaged in an educationally meaningful manner. High levels of interaction may be reflective of group cohesion, but it does not directly create cognitive development or facilitate meaningful learning and understanding. Interaction directed to cognitive outcomes is characterized more by the qualitative nature of the interaction and less by quantitative measures. There must be a qualitative dimension characterized by the interaction that takes the form of purposeful and systematic discourse.

Picciano (2002) made a distinction between interaction and presence. Interaction carries with it few conditions with regard to the nature of communication and influence. Interaction by itself does not presume that one is engaged in a process of inquiry and cognitive presence exists. An educational experience sets a qualitative standard perhaps best reflected by the model of a community of inquiry. A community of inquiry integrates cognitive, social, and teaching elements that go beyond social exchanges and low-level cognitive interaction (Garrison and Anderson 2003). Rovai (2002) found a "positive significant relationship between a sense of community and cognitive learning.".

D. Randy Garrison and Martha Cleveland-Innes had done the analysis course (academic course) variable which acts as a surrogate for type and level of interaction, and instructor involvement, in online conferences. Time refers to the difference in approach to learning from the start of the course to the end of the course.

Table 1. Instructional Differences Across Groups

	Course A $N = 32$	Course B $N = 11$	Course C $N = 13$	Course D $N = 19$
Instructor involvement	Low	Low	Medium	High
Level of overall interaction	High	Medium	High	Low
Reflective assignment requirements	Medium	Medium	Low	High

It is expected that scores across all approaches will vary as students become familiar with the learning environment in which they are currently engaged. In higher education, a deep approach is the desired approach. Deep scores should be the highest and increase over the length of the education experience.

A two-way repeated-measures Analysis of Variance was used to determine the interaction between time and course for this sample. The between-subjects variable is the course (Courses A, B, C, D). The within-subjects variable is time (Time 1 and Time 2). The results of the interaction between course and time, for each approach to learning, are presented in Table 2.

Table 2. Analysis of Variance

Approach to Learning	Source	*d.f.*	*F*	Sig.
Surface approach	Time × course	3, 72	1.421	.244
Deep approach	Time × course	3, 72	2.706	.050
Achievement approach	Time × course	3, 72	1.291	.284

It is clear from these results that the shift in how students approached their study is strongly influenced by the design and teaching approach. It appears that teaching presence contributes to the adoption of a deep approach to learning and that interaction by itself does not promote a deep approach to learning.

So the research by D. Randy Garrison and Martha Cleveland-Innes suggests that simple interaction, absent of structure and leadership, is not enough. We need to have a qualitatively richer view of interaction.

There is a strong need to study the qualitative nature of online interaction in terms of teaching and learning approaches. The position here is that the reflective and collaborative properties of asynchronous, text-based online learning is well adapted to deep approaches to learning (i.e., cognitive presence). Further study is very much needed to understand the nature of online interaction that will support high levels of learning.

Another Research was provided by the Psychologists namely Yuliang Liu and Dean Ginther. They researched the students' cognitive styles and their adaptation to the design of distance education.

They stated four major instructional stages for the adaptation of the design and delivery of distance education to students' learning styles:

1) **Instructional Planning**

   In this stage, the teacher should fully consider the cognitive style characteristics of all students. Specifically, three major aspects:

   a) **Audience Analysis**

      The teacher should use appropriate cognitive style instruments to measure and identify the student's cognitive styles either before the start of the first class or in the first class. The teacher should be sure to know the students' preferred cognitive styles. These styles include field independence vs. field

dependence, holist vs. analytical, sensory preference, hemispheric preference, and/or Kolb's learning styles. All these will become the basis for the teacher to prepare for the distance education classes.

b) Terminal Objectives

Terminal objectives should be comprehensive to meet the cognitive style characteristics of all students. In order to maximize the students' potential performance, the terminal objectives should focus on the students' preferred cognitive styles described above, as well as the nonpreferred cognitive styles.

c) Instructional Preparation

After identifying students' cognitive styles, the teacher should make full preparation for the match between cognitive styles and instructional contents, methods, and styles.

These include:

- what kind of instructional materials to teach
- what kind of learning environments to provide
- what kind of teaching methods and styles to use, such as the appropriate use of tapes, diagrams, etc.
- what kind of formal instruction and informal activities to plan, and
- what kind of evaluation techniques to use.

2) Learning Environment Construction

Appropriate construction of supportive environments, either physical or psychological, can facilitate an individual's innovative achievement (McClusky, 1976; Mumford & Gustafson, 1988). Supportive learning environments in distance education include two important aspects: online contact and diversified learning styles.

a) Online Contact

b) Diversified Learning Styles

3) Teaching Method Selection

In order to effectively match the teaching styles with the students' cognitive styles, the teacher should take the following considerations. This part involves two major aspects. One is to match instructional materials with cognitive styles. The other is to match teaching styles with cognitive styles.

a) Matching the instructional materials with cognitive styles.

- **Matching the type of content with verbal-visual style.**
- **Matching the type of content with Kolb's abstract-concrete style.**
    - In terms of content, the teacher should provide abstract information to the convergers and provide concrete information to the divergers in the instructional process.
- **Matching the type of content with Kolb's career preferences.**
    - In terms of content, the teacher should provide different examples to different students to their different career preferences. Specifically, the teacher should provide examples in liberal arts and humanities to the divergers; provide examples in physical sciences to the convergers; provide examples in research and planning work to the assimilators; provide examples in marketing and sales work to the accommodators.

b) Matching the teaching styles with cognitive styles.

- Matching instructional strategy with field dependence-independence style.
    - In terms of instructional strategy, cooperative learning is an important learning strategy that can overcome the problems of distance education and improve students' deep processing skills (Savard, Mitchell, Abrami, & Corso, 1995). In addition, the teacher should allow both cooperative learning and individualized learning in the whole class.
- Matching the layout of materials with holist-analytic style.
    - In terms of the layout of learning materials, the teacher should not only provide the holist view of materials but also

provide diagrammatic materials such as tables and tree diagrams.

- Matching the conceptual structure with holist-analytic style.
    - In terms of the presentation of the conceptual structures of the material, the teacher should provide instructions for stressing both the whole and the parts. Specifically, holists need an organizer to identify the parts and structure of the material and analytics need an overview to provide a picture of the whole (Riding & Rayner, 1995).
- Matching the choice of presentation mode with sensory preference.
- Matching social preferences with verbal-imagery style.
- Matching the teaching aids with hemispheric preference.

4) **Evaluation Administration**

The administration of evaluation in distance education includes two major aspects. One is **assessment**, the other is **feedback** about assessment.

REFERENCES:

[1] Cognitive Styles and Distance Education

[2] Facilitating Cognitive Presence in Online Learning: Interaction Is Not Enough (D. Randy Garrison &Martha Cleveland-Innes)