Transactional Distance Theory and Scaffolding Removal Design for Nurturing Students' Autonomy

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Abstract This paper prorposes eight design principles to nurture autonomy of college students, based on re-conceptualization of Michael Moore's Transactional Distance Theory (TDT). After proposed in 1970's, TDT has been helping to concepturalize distance education in terms of psychological, not physical, distance among people involved. TDT, on the other hand, has been creating confusions and misinterpretations when utilized in the research and practices of distance education. COVID-19 has forced all educational practices to be offered as distance education, which made us realized the importance of student autonomy, when limited guidance could be offered. Utilizing the framework of TDT, this paper proposes eight ways to create and then withdraw scaffoldings to help learners more self-independent and autonomous.

Key words: Transactional Distance Theory, Design Principles, Scaffolding, Removal, Autonomy, Higher Education

INTRODUCTION: NEEDS FOR NURTURING STUDENTS' AUTONOMY

Campus shutdown caused by COVID-19 affected deeply to our ordinal education in every sectors in all the countries worldwide. This experience helped us realized how deeply we have been relying on direct contacts with students on a regular basis, for us to function well in helping students' continuous effort in keeping themselves engaged in their study. While most, if not all, of on campus professors and teachers felt uncomfortable not being able to have direct contacts with students regulally, it had been a normal practice for those who had worked in distance education programs, including the authors of this paper. It has long been a central theme in distance education, how to help its students to become more independent and self-regulated, so as to survive in a learning environment that requires autonomy on the students' side. It may have not much so, however, for those who are working in on-campus settings, where teachers and professors can expect that the students come to campus and allow them to get direct assistance to keep up with their continuing learning. Fox, et al (2021) pointed out, in a report by *Every Learner Everywhere*, that one of the evidence-based principles for after COVID-19 higher education to be "meta-cognition, self-regulation, and agency, incorporating practices that help students learn to be a better learner and take control of the learning process (p. 8)." Glantz, et al (2021) suggested "Student Experts for Learning and Technology Support" to be one of the five innovative practices observed under COVID-19 campus shutdown that should be continued to enhance student engagement in higher education's next normal: "As we move to the next normal, higher education leaders should consider expanded roles for undergraduate experts who assist with learning *and* technology support (*italic* original)."

With this sudden interuption by COVID-19, not only do we as providers of education need to be more functional to utilize online learning technology, but also we should re-capture our ultimate goal of higher education: i.e., to help the students to become independent learners. Suzuki & Mima (2018) have proposed that it should be a primary learning goal, especially at the very beginning of their college lives, to acquire learning skills to become autonomous learners. In this regards, all educators can and should learn from the effort of teachers in distance education programs, as OECD (1996) pointed out even before the outbreak of e-learning around 2000 that we should make the best use of ICT regardless of the modes of delivery, not only in distance programs, but also in face-to-face programs.

It is obvious that the more self-directed the students are, the more likely to be successful in an learning environment that gives less support. We all learned this, by our own experiences during the campus shutdown, as expressed even by the students themselves in a recent survey conducted in Japan. Out of 1000 respondents in an 18-year-old Survey (Nippon Foundation, 2021), almost half (n=489) felt disparity, due to not only economic situation of the family (n=253) and school functionality (n=149), but also to their effort (n=121). Such reasons was stated as “study or not study depends on ourselves,” “not motivated students didn’t make the best of what they had,” and “all dependent of firm mental willingness to study.” To ensure meeting the needs of students after COVID-19, it is good to take a lesson from the research traditions in distance education so we can design better learning environment to foster autonomy of the students in all modes of higher education.

Therefore, the purpose of this paper is to introduce and re-interpret one of the major theoretical contributions in distance education research, namely Michael Moore's Transactional Distance Theory (TDT). Utilizing the framework of TDT, this paper proposes eight ways to create and then withdraw scaffoldings in the face-to-face education on campus after COVID-19, to help learners more self-independent and autonomous.

TRANSACTIONAL DISTANCE THEORY: CONTRIBUTIONS AND CONFUSIONS

Michael G. Moore proposed TDT in 1970’s, introducing the concept of distance education, pedagogically defined, not by the physical distance between the provider and students, but that of psychological distance, i.e., transactional distance. We all know, from our own experiences, that even being in the same large lecture hall, a student may feel very far away from his/her professors, whereas an intimate relationship can be nurtured with a professor even when a student is taking a course from the other side of the glove. For education to produce any learning outcomes on the side of the students, it has been our effort to make phycological distance closer with students, known as teaching presence (Garrison, Anderson, & Archer, 2000).

Moore modeled that three key factors play in determining the transactional distance; (1) dialog, interaction with a teacher in the form of explanations, encouragement, and feedback, (2) structure, referring to the responsiveness of the course program to the needs and interests of the learner, first, then "rigidity or flexibility of the program's educational objectives, teaching strategies, and evaluation mothods (Moore, 1993, p. 26)", and (3) autonomy of students. TDT has long been utilized in the practice and research in distance education (Bray, 2007; Kumagaya, 2009; Shearer & Park, 2019), where much of the desired dialog was impossible or not feasible first, as in correspondence education; then gradually became more and more possible due to the advancement of the Internet technology. None the less, high degree of autonomy has always been required for a distance student to be successful in learning.

The lack of operational definition of structure in TDT, affecting transactional distance, however, has caused confusions and misinterpretations among practitioners and researchers since then. Kumagaya (2009) pointed out Moore's change of the use of terminology from individualization to structure may have caused confusion, which triggered misuses of the term even in the writings of Moore himself. Gorsky & Caspi (2005) accused that if, as Moore pointed out, structure and dialogue have an inverse relationship, then "(the) theory may be reduced to a single proposition: as the amount of dialogue increases, transactional distance decreases" and that "this proposition may be construed as a tautology, not a theory (p. 7)." Shearer & Park (2019) pointed out the need of clearer definition of structure and autonomy as three main themes of the future task of the research related to TDT.

Garrison (2000) stated: "In Moore's theory, the most distant program has low dialogue and *low* structure while the least distant has high dialogue and *high* structure (p.8; *italic* added)." Although structure is interpreted conversely from Moore's original definition, Bray (2007) agreed with Garrison by saying that "(Garrison's) summary seems more consistent with Moore's writings in general (p. 41)," and suggested more positive and broader interpretation of structure as student-content interaction: "Moore stated that as course structure increases, transactional distance would increase, but this idea was a product of times when distance education was mainly designed for mass education and course structure was rigid, with little interaction with teachers and peers possible. Moore's view seems to be that course structure was essentially a negative feature of a program, perhaps more properly termed course rigidity, that when high, blocked students from expressing their self-directedness and creativity (p.38)."

It has been the goal of recent instructional design to provide a clear set of learning objectives with relevant assignments and explanations so that learners would not be lost in accomplishing the required tasks to attain the objectives. We have learned many ways to facilitate individual learners' free choices of action, such as to make the order of learning up to individuals, to test mastery at earlier stages to avoid unnecessary learning, etc, even in learning materials with high degree of structure. Structure, when prepared well, should help the learners with lower autonomy, while more advanced learners may proceed by themselves without such clearly structured materials. With an advanced technology, high structure does not necessary imply that all students would be required to learn the same way, which may have been

the case when Moore proposed TDT in its original form. Thus, high structure should help the learners feel transactional distance closer by having more help in learning.

RE-DEFINITION OF TDT USING SCAFFOLDINGS

In a hope that TDT will become a useful help in constructing after COVID-19 higher education on campus, Suzuki & Hiraoka (2021) has proposed a re-interpretation of TDT elements of dialog and structure in terms of the amount of scaffoldings given to the students, provided during and prior to the transaction, respectively. Structure, re-defined as the amount of scaffoldings prepared in the learning environment prior to the beginning of education, can be high, if the students were well-guided with no worries of what to do, and how to do them. This is one of the goals of what instructional designers would aim to provide to make their products effective and engaging, by enough amount of scaffoldings. Having a clear set of learning goals, assessment criteria, and structured series of assignments, as well as structured provision of relevant information with motivating examples, are some of the strategies to accomplish the goal. In a sense, the goal of well-designed pre-packeged instructional materials may reduced the needs of frequent dialogs to be provided after the learning started. If the structure provide less than adequate scaffoldings, then the students may be lost in learning, which would require more amount of scaffoldings during the course of learning, i.e., more demands of dialog would exist.

However, the amount of scaffolodings provided by the structure is independent of actual amount of scaffolodings provided by the dialog during learning. The amount of dialog may be very frequent and timely in a very kind provision of instruction on one hand, another provision of instruction may provide very rere and delayed dialog, on the other hand, using the same structure. The adequate amount of scaffoldings would depend on the degree of autonomy of the students: a student with less autonomy may feel the first provision very kind and fit with his needs, whereas another student with high autonomy may feel it annoying and destructive for her to go ahead and proceed her learning on her own. High degree of structure may also annoying to highly autonomous students, if it does not allow to skip some portion of instruction that they already know, or it does not require any creative or optional products for faster or higher acheivers. Thus, the optimal amount of total scaffoldings by both structure and dialog depends on student’s levels of autonomy. If we aim at nurturing more autonomy for each student, then we need to design and monitor the scaffoldings being withdrewn, as the autonomy level increases. Figure 1 shows the relationships among the three factors with scaffolding removal to adjust to the optimal level.

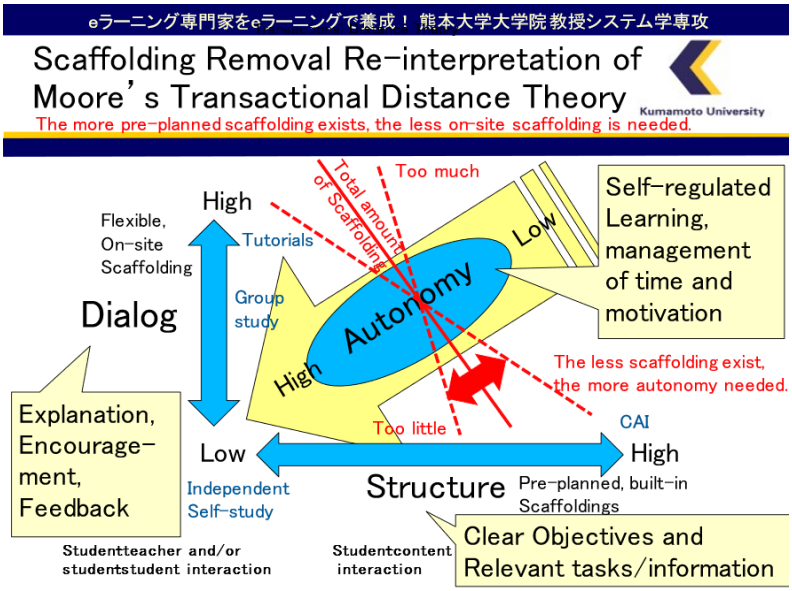

Figure 1: Transactional Distance Theory Re-interpreted with Scaffolding Removal Design

DESIGN PRINCIPLES FOR AUTONOMY

Table 1 shows some examples of design principles for nurturing autonomy, proposed by Suzuki & Hiraoka (2021). If we intend to make changes in the after COVID-19 higher education on campus, with the aim of nurturing autonomy at the core, we must design fading the scaffoldings throughout the course of the entire curriculum. We must not be too kind, not to take away the responsibilities and independence of students, gradually toward the later part of the college life, if not from the very beginning of the first year. At any rate, some careful and considerate withdrawal of scaffoldings must be purposefully designed to make the college graduate independent learners.

CONCLUSIONS

This paper prorposed eight design principles to nurture autonomy of college students, based on re-conceptualization of Michael Moore's Transactional Distance Theory (TDT) that has served as the most heavily used framework in designing distance education. After introducing the three key factors determining the transactional distance, it was reviewed that TDT has been creating confusions and misinterpretations when utilized in the research and practices of distance education. Utilizing the framework of TDT, this paper proposed eight ways to create and then withdraw scaffoldings to help

learners more self-independent and autonomous. COVID-19 has forced all educational practices to be offered as distance education, which made us realized the importance of student autonomy, when limited guidance could be offered. If we consider that all programs of higher education, regardless of the mode of operation, to fillful the function of making the graduates independent learners, then not only distance program, but also on-campus programs can make the best use of research findings and theories from distance education. It is the authors' hope that this paper will guide to create such practices in many higher education programs with our re-interpretation of TDT and suggestions in mind.

Table 1: Suggested Design Principle Samples with Examples

Design Principle	Example
1. Shifting from Final Exam Only to Multiple Assessments	Allow learners accumulate points toward the passing criteria by setting multiple tasks and multiple-choice quizes during the course
2. Shifting from Teacher Progress Management to Learner Schedule Management	Allow learners flexible self-management of learning pace by making learning schedule and learner progress visualized with flexible deadlines for accessing learning resouces and submitting assignments
3. Shifting from Learning from Teacher to Learning from Information/Materials	Allow learners learn from textbook and other resources on the Internet by making them required readings and/or setting an inquiry-based tasks
4. Shifting from Learning from teacher to Learning from Each Other	Facilitate corporative learning by making dialog records visible to others and/or making mutual commenting and checking a part of the required tasks
5. Shifting from Common Assignments for All to Adaptive/Selective Assignments	Allow individual learners construct their own learning by requiring an additional option to the common assignments and/or allowing flexible approach to the same common assignments
6. Shifting from Tasks with One Correct Answer to Tasks Requiring Originality	Allow learners express originality by assigning tasks to express own ideas and/or to appeal original outcomes in the tasks
7. Shifting from Assessment by Teacher to Assessment by Learners using Checklist	Allow learners self-evaluate, confirm, and making an appeal of their own learning outcomes by providing assessment method such as a checklist
8. Shifting from Teacher-Initiated Help to Learner-Sought Help	Allow learners deciding when to ask for help anytime as needed by creating such a mechanism and limitting teacher's initiation of helping

Note: Translation of Table 1, Suzuki & Hiraoka, 2021 by authors

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