



School of Computing  
Blekinge Institute of Technology

# **Designing distance learning for the 21<sup>st</sup> century:**

**Constructivism, Moore's transactional theory  
and Web 2.0**

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## ABSTRACT

Distance learning has been playing an ever more influential role. Yet there remains little rigorous academic research into distance learning pedagogy, lacking of serious study in management, delivery and organization of distance learning has destabilized the field.

Recently, the boom of Web 2.0 has made websites a lot more intuitive, interactive and interesting; Web 2.0 is also widely used in distance education. Study of distance education as a result sometimes has been misdirected, instead of understanding and solving the real issues facing distance education, research in the field devoted entirely to technology usage discarding the very issue of effective education in distance context. In other words, instead of pursuing technology-relevant policies we focus on technology-driven policies.

This thesis starts by reviewing learning theories and arguing for the case of why one is more suitable for distance learning than others. The author argues that constructivism, which favors a dynamic learning process, encourages people to interact, share ideas and bounce ideas is the more effective learning theory. But deploying constructivist pedagogy into real life is difficult. We need more concrete ideas as to how to organize distance learning, a framework to benchmark distance education, to evaluate distance education. That is where Moore's transactional theory which actually derives from constructivist pedagogy comes into the picture. Moore pointed out 3 key areas of distance education: dialogue, structure and learner autonomy. Moore argues that by having enough constructive dialogue, flexible structure catering individualism and a high level of learner autonomy to execute learning; we can reduce "distance" in distance education. Moore is equally concerned about pedagogy as he is about technologies and he has incorporated into his theory how technological changes have influenced the way distance education has been delivered for the better. This is the brilliance of Moore's, he has not sided with either pedagogy or technology, he observed the rise of technology and the influence it has on distance education but refused to see technology as the sole factor that makes distance learning more effective or reduces "distance" in distance education.

The linkage between constructivism and Moore's theory is of significance although it is only barely acknowledged in Moore's writing. The magnitude of this connection is that first it highlights that the work that Moore has done has been based on strong theoretical pedagogy, his contribution is that he has simplified a grand ideology into something that can be applied in the class room. Also he has succeeded in refining elements of constructivism into working variables for quantitative research.

His theory is still highly relevant today but his analysis of technologies' roles has not yet included the latest explosion of technologies in the post-1993 age: the Internet, the booming Web and especially the new Web 2.0. The aim of this thesis is to extend his analysis to these new technologies. We studied how the explosion of Web 2.0 services have been facilitating rich dialogue among peers, teachers and learning materials, allowing more individualization to educational settings and structures. Also Web 2.0 lowers the barrier to participation and content generation and thus would be expected to encourage learner autonomy.

A large part of the thesis has been dedicated to literature review. This is because the author believes that in order to improve distance education, it is necessary to first understand learning theory to know when and how people learn, and explore the nature of distance education to see the differences between distance and non-distance education, and then have a comprehensive plan to implement distance education, and evaluate that plan.

The implementation bit is of course a practical project; the author used a real-life course at Umeå University where students from various backgrounds signed-up to learn about how Web 2.0 can be leveraged to enhance distance education. A constructivist approach was adopted so we had a chance to see how it actually turned out. We used Moore's transactional distance theory to evaluate the impact of introducing Web 2.0.

**Keywords:** distance learning, constructivism, Moore's transactional distance theory, Web 2.0

## FOREWORD

First of all, I would like to thank Sara and Per for their continuous support during my two year study of MSc Informatics programme. The programme is a very special one, I always wish to have a real chance to be part of a formal distance-learning programme and this provides exactly what I wished for except that it also exceeds my expectation in many ways. I get a chance to know people whom otherwise I wouldn't have met. I get a chance to have some appreciation for Sweden 's manifesto and values which could be found also in informatics. But more importantly, the academic side is simply excellent, the programme covers many aspects of informatics so theoretical and mind-engaging and so bread-and-butter to everyday job and life.

For so many years, being a student learning to understand things, I have developed very strong interest in how to make education better. I have been to more traditional academic institutions with formal teaching style and I have also been to more relaxed places with a very different view of what education should be like in the 21<sup>st</sup> century. The ideological differences have stirred my curiosity as to what makes effective learning.

I am a computing engineer by training and by profession, witnessing with a technical eye the impact that Information and Communication Technologies have made on every aspect of our lives and societies, I believe technologies are part of the solution and an enabler for designing new more effective and more accessible education. But it is also important not to get carried away by technologies, education in the era of WWW and Internet should be technology-relevant rather than technology-driven. I will look at learning theory, pedagogy and discuss how Web 2.0 could contribute to pedagogy and make possible what is more difficult to achieve

Those are the factors that led me to choose my thesis to write about redesign distance education i.e. to understand the nature of education, to explore what makes effective learning and uncover some myths about it; and finally I propose and implement ICT relevant to effective learning. My main settlement will be academic environment but non-academic environments will also be covered. Also I explore ways to overcome the "digital divide" because distance-learning is about flexibility and opportunities for all, we could not let division happen.

This would not be possible without the help of Sara and Per throughout my two-year studies at Blekinge Institute of Technology and I have special thank reserved for them. I would also thank all teachers, administrative staff and students whose names are too many to list here. Without them, the experience at Blekinge would have been so different.

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## **Part 1: Introduction to distance learning**

# 1 INTRODUCTION TO DISTANCE LEARNING, DEFINITION AND HISTORICAL CONTEXT

Distance-learning is the flexible delivery of education to students so they can learn at their chosen site, time and pace. Distance-learning is supposed to provide equal qualitative values e.g. knowledge, curriculum, examinations etc to learners as if they actually attend a traditional on-site course. ([http://en.wikipedia.org/wiki/Distance\\_education](http://en.wikipedia.org/wiki/Distance_education))

E-learning refers to the electronic delivery of education, in other words, information and communication technologies serve as media to implement the learning process. The “e” element of e-learning refers to the content transmission via one or many of channels such as: Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. E-learning has variations in mere presentation such as elearning, Elearning, and eLearning and in wording such as CBT (*Computer-Based Training*), IBT (*Internet-Based Training*) or WBT (*Web-Based Training*). (<http://en.wikipedia.org/wiki/E-learning>)

Distance education has a long history in Scandinavia. Earliest form of distance education was found in folk high schools started in Denmark in 1844 to cater informal education for adults. The main pedagogy of folk high schools, which were formulated by Danish teacher, philosopher and pastor by the name N.F.S. Grundtvig (1783–1872), was pedagogy of active participation and experimentation of learners during their studies. In 1898, an institute sharing similar idea of teaching and learning was created in Malmo, Sweden named Hermods where teaching materials and feedback were mailed back and forth between teachers to students. Hermods today still run similar courses with contents disseminated not surprisingly via internet rather than through post. The early concept of learning concentrating on active participation and pro-activity of Grundtvig could be found in later pedagogical philosophy and researches and his idea still hold relevance to today’s education. (Milrad & Flensburg, 2007)

In university settings, University of London, UK had to overcome a lot of hassle, i.e. objection of a godless university and argument over its degree-granting power, to offer distance-learning degrees. Referred to as “People’s University” by Charles Dickens because it provided access to higher education to students from less affluent backgrounds, the University was finally chartered by Queen Victoria in 1858 to make it the first university to offer distance-learning degrees. Enrolment steadily climbed in the late 19th and early 20th centuries, and during World War 2, soldiers stationed abroad and those imprisoned in German camps also enrolled. Geneva Convention 1929 made sure every war prisoner received not only food and health care but also correspondence. British prisoners took advantage by signing-up to University of London External Programme, receiving materials by post and taking invigilated exams in the camps at specified intervals. Almost 11,000 exams were taken at 88 camps between 1940 and 1945. Not surprisingly, failure rate was high ([http://www.londonexternal.ac.uk/about\\_us/index.shtml](http://www.londonexternal.ac.uk/about_us/index.shtml)) but it is not the number who failed but the numbers who earned degrees while imprisoned.. Elsewhere, in Australia, University of Queensland opened its Department of Correspondence Studies in 1911. In South Africa, the University of South Africa has run Correspondence Education courses since 1946. In New Zealand, Massey University has offered university-level distance education or extramural study began in 1960. ([http://en.wikipedia.org/wiki/Distance\\_education](http://en.wikipedia.org/wiki/Distance_education))

1960s and 70s witnessed a boom in distance education with the founding of academic institutions dedicated to distance learning often by the name Open University (in English or local language). Today the Open University is the largest university in the UK and dozens of

its sisters are now “mega-universities” each of them has enrolment of more than 100,000 students. ([http://en.wikipedia.org/wiki/Distance\\_education](http://en.wikipedia.org/wiki/Distance_education))

It is also notable that distance-learning development comes hand-in-hand with ICT development. Postal service in 19<sup>th</sup> century led to growth in commercial correspondence colleges running courses by posting materials to students. When cinema was invented in 1913, the great inventor Edison predicted "traditional school is finished; the cinema will replace everything that existed before, and will be much more effective". The invention of radio in 1921 created possibility to send messages hundred miles far and wide and university courses were broadcasted to ill students or those who couldn't leave home. When Alexander Graham Bell invented telephone in 1876, the idea wasn't for conversations between caller and callee but for purposes such as listening to live concerts. Soon people creatively used it for other purposes including developing telephone networks which subsequently gave sick or hospitalised students access to classes otherwise they couldn't attend. At the same year, TV was invented, France took the opportunity and broadcasted 15 hours of education programme while World War 2 slowed TV education programmes and interrupted others, military training efforts meant the potential for using audio-visual media in teaching was very still there.

([http://www.digitalschool.net/edu/DL\\_history\\_mJeffries.html](http://www.digitalschool.net/edu/DL_history_mJeffries.html))

Other milestones of ICT development includes introduction of the first electronic computer in 1944, first telecommunication satellites in 1963, digital telephone is invented along with digital video and audio technologies in 1970, microprocessor 1971, internet connection in 1972 and World Wide Web (or www or Web) in 1991

([http://www.digitalschool.net/edu/DL\\_history\\_mJeffries.html](http://www.digitalschool.net/edu/DL_history_mJeffries.html)) and Web 2.0 in 2004 during the O'Reilly Media conference. Every time ICT hits a milestone, distance education went from strength to strength, but nothing has been so sensational in the development of distance education like Web 2.0. (<http://oreilly.com/web2/archive/what-is-web-20.html>). With Web 2.0 very much still in fashion and continuously evolve, distance learning in the form of e-learning i.e. delivery of education by electronic means has gained new life to become e-learning 2.0 (<http://en.wikipedia.org/wiki/E-learning>) and educators soon look to revamp their pedagogy to form pedagogy 2.0 to mark a new era of distance learning. (McLoughlin & Lee, 2007)

## **Part 2: Theory of distance learning**

## **2 RESEARCH METHODS**

### **2.1 The significance of the study**

For over 100 years, distance learning has played a pivotal role in educating millions yet there is little rigorous research in to pedagogy of distance learning.

Another trend is development of distance learning has been influenced by development of information communication technologies but practitioner deployed technologies only to bridge the physical distance communication problem without consideration for proper design and apply technologies to enhance students' learning experience.

Moreover, extant literature leaves many questions to be answered. First, some research articles merely described the usage of technologies and confirmed the overall positive effect through questionnaires rather than providing an underlying theory to explain their claim. Second, as technologies evolve quickly, research sometimes lags behind. Study the effects of outdated asynchronous websites audio lecture and synchronous chat tools and VoIP rather than the complex virtual collaboration environment that Web 2.0 offer.

My thesis looks at the pedagogy of distance learning because without understanding what distance learning is, it is difficult to convince what makes good distance learning. Later, the thesis studied latest technologies and its capability to realize pedagogy in virtual learning environment.

### **2.2 Study aim and purpose**

One of the aims of this study is to look at the pedagogy of distance learning. Moore's theory of transactional distance explained the nature of "distance" in distance learning as "a psychological and communication gap" and not just physical one. He also concluded distance learning is also inherently learning so what makes good learning will also makes good distance learning. Therefore, we looked at the pedagogy of learning and tilt toward constructivism as a more effective theory compared to objectivism. Interestingly, Moore's theory derives from constructivism and his genius is to translate constructivism grand idea into operational variables i.e. dialogue, structure and learner autonomy interworking to yield positive educational outcome. This makes constructivism applicable because one of the strong criticism of constructivism is teachers sometimes struggle to relate the theory into a coherent plan in class room. Through personal participation in a Web 2.0 experimental effort at Umea University and Kane and Finchman (2009), we see technologies can offer some interesting features of constructivism. Then the whole classroom experience is evaluated using Moore's theory. Overall we conclude that Web 2.0 can leverage to build a constructivism learning environment.

The finding of this study at a theoretical level is to inform the nature of distance learning and the possibility to bridge that distance gap of distance learning. At a practical level, it shows that Web 2.0 if correctly and creatively used can have that capability to overcome the possibility.

## **2.3 Research questions**

The following research questions guided my thesis flow.

The research questions are:

1. What is distance in distance learning, how distance learning is different from learning?
2. How do we reduce “distance” in distance learning? And how do we measure reduced “distance”?
3. Can technologies provide the extra capability to reduce “distance” in distance learning? Have similar efforts tried elsewhere and what is the outcome of those efforts?

## **2.4 Research methodology**

Cresswell (1994) stated that descriptive method gathering information about the present existing condition with the emphasis on understanding and not interpreting. As such my thesis started out as a descriptive effort depicting the nature of distance education as well as constructivism.

My thesis provided an analysis of Moore’s theory to validate it as a hypothesis by analyzing its key constructs and empirical findings. Constructivism is a high-level idea and stays in-line with Moore’s prediction of reducing transactional distance. These two perspectives therefore overlap but Moore provided the operational tenant of transactional distance.

The prediction research element in my thesis argued that Web 2.0 have unique capability to reduce transactional distance. To verify the prediction, my thesis used secondary qualitative research of a case-study by Kane and Finchman (2009) and an action research effort that the author actively involved in.

## **3 LEARNING THEORY: OBJECTIVISM VS. CONSTRUCTIVISM**

### **3.1 Objectivism or behaviorism learning theory**

#### **3.1.1 Introduction to objectivism**

Objectivist pedagogy or instructional pedagogy is based on the core idea that knowledge is objectivist. Learning in this way is a one-way transmission of knowledge during instruction, lecture and practices from a content provider e.g. a teacher provides content to students or learners learn based on a fixed curriculum developed solely by a content provider. Relied on the objectivist knowledge belief, instructionists assume that true reality is determined as “a large accumulation of facts” (Kelly, 1970). Another dominant follower of objectivist Lakoff (1987) put the case of objectivism as "one version of basic realism" and reality exists independent of humans. Lakoff's (1987) wrote "knowledge consists in correctly conceptualizing and categorizing things in the world and grasping the objective connections among those things and those categories" (p. 163). That means there is only one correct reality independent of individual learner. By applying science methods, reality could be deconstructed into properties and structures and then modeled after. Hannafin, (1997) compiled objectivist materials and described the role of objectivism instructionists to “emphasize methods that establish and convey the meaning of objects and events consistently and efficiently across learners” and “the learner's task is to recognize and label relevant objects and events, organize them into coherent chunks, and integrate new with existing knowledge. The learner accomplishes these tasks principally by decoding the established meaning of various objects and events, using the cueing and amplification devices provided by the learning systems designer.” Philips (1998) reconfirmed “in the objectivist theory (Marra and Jonassen, 1993), a nominalistic view of knowledge is held.

Knowledge is thus regarded as existing independently of any human experience and the role of the learner is to acquire it. Objectivists place a strong emphasis on defining learning objectives and implicitly assume that the learner is an empty vessel, to be filled by the instructor (Reeves, 1992).”

The industrial age gave us process and standardization which influence not only in manufacturing but also in education. Tyler (1949), for example, see curriculum as a product, teaching as production process, academic institutions as business organizations and call for application of standardization into education. By applying standards, they argue, will measure the effectiveness of teaching on students, and thus hold accountability to teachers. Teachers’ performance and school’s performance will be monitored and compared among themselves.

### 3.1.2 How a course was designed with objectivism pedagogy

Vrasidas (2000) pictured Taylor rationale education organization as below:

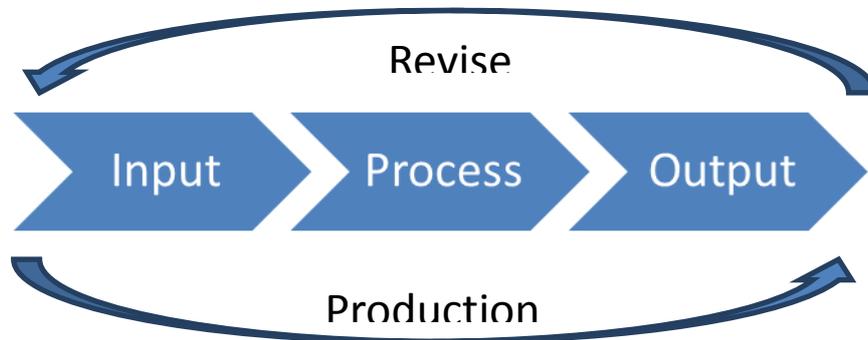


Figure 1. The process of delivering a course in objectivism approach is perceived as a linear process.

In the “input” phase, a teacher will decide learning objectives, organize content into smaller chunks and decide ways as how to deliver sessions. “Process” phase refers to the ongoing real-time class. Output will be measured against input to validate process and production starts again from input → process → output as a repetitive occurrence of education.

Vrasidas (2000) illustrated how a teacher prepares for a course with instruction design model by an example of a hypothetical distance-learning university course at graduate level named “*Telecommunications for learning and instruction*”. The main principle throughout the lifecycle of education is the analysis principle of breaking things down to manageable chunks and executing them accordingly. Analysis activity in the input phase is content analysis where content is broken down to certain topics with key objectives to be achieved and issue to be countered. Teacher is the content expert and is in charge of content analysis. Another analysis activity is task analysis i.e. deciding what tasks students should complete during the course. Again a teacher is in charge and expected to know what type of tasks is expected and how to go about it. Students are followers. If input is analysis, then process is linear execution of the plan set-out. Two objects of analysis in input phase are content and task and the subject is the teacher thus most activities during the process phase is activities between teacher-learner and teacher-content. This also means that one type of interaction is underestimated and not encouraged which is the interaction between learner and learner which is one key constitution dimension of distance education according to eminent distance-education scientist Michael Moore (1989). Learner-content interaction is promoted by activities such as readings or literature review, teacher-learner in distance-education is conducted through video conference lectures, email-exchanges or forum discussion. Learner-learner which only occasionally happens is in group-work but still directed by teacher. Output is when objectives are measured and evaluated, students ‘performance is measured by observable behaviours when undertaking tasks set out by the teacher. The objectivist and behaviourist pedagogy could also be found at one of the finest and reputable universities: Harvard University. Its Roland Christensen centre of learning and teaching published several articles on pedagogy modelled after that of Tyler. (<http://www.hbs.edu/teachingandlearningcenter/in-practice/publications.html>). Furthermore, Perkins (1998) has put it that “virtually all contemporary approaches to teaching and learning have a constructivist cast” (p. 55).

### 3.1.3 Objectivism pedagogy comment

Objectivism pedagogy itself in many ways is a flawed model. To regard knowledge as one and only; and conveniently dismisses different views and understandings, different contexts and experiences of individuals in the process to interpret facts. Teaching in objectivism means trickle facts down to empty vessels without feedback or dialogue, teacher plays a control role and students play a compliant role. Learner's interaction and participation are not encouraged as a way to reinforce learning. Objectivist approach does help students to learn because it is the way education has been done for thousands of years, but it doesn't help or at least doesn't encourage students to see different facts and interpretation or ways to approach problems. Also when teachers have the mandate to set curriculum, to decide what is true and what is good, to transfer knowledge to students like water pouring down, the most students will know is as good as their teachers, while that may be good enough or more than enough in many cases, it would mean death to innovation and creativity which are forces driving us forward.

## 3.2 Constructivism learning theory

### 3.2.1 Introduction to constructivism

By now, we should have had quite a clear idea about objectivism; constructivism if anything is diametrically opposite to objectivism.

If objectivism views knowledge as independent and outside of learners to be consumed constructivism views knowledge not as fixed entity but is constructed by individual learners based on their own subjective experience (Sener, 1997). Hein (1991) claimed "there is no knowledge independent of the meaning attributed to experience (constructed) by the learner, or community of learners." Driscoll (1994) echoed his colleague "the human mind does not copy reality from outside directly, rather, it constructs reality". Constructivism accepts and encourages each subjective experience as valid as any others thus knowledge is not constructed by any objective criteria (Poerksen, 2004a). And because "not two people necessarily have the same constructions" there would be many realities each represent unique personal experience. Objectivism views knowledge as a static reality, Kelley (1970) views knowledge is in continuous change just as we continuously build on our own experience. In objectivism' view, knowledge is about the world while in constructivism' view knowledge is constitutive of the world (Sherman, 1995). In objectivism' view, learners are knowledge consumers, in constructivism' view learners are knowledge constructors (Sener, 1997) that turn the role of learners from a passive receiver to be the active creator in the learning process. (Larochelle and Bednarz, 1998).

If objectivism was the popular learning as early as two decades ago, constructivism is the learning theory of today (Gulati, 2004; Boghossain, 2006) at least at face value for political correctness (McCarty and Schwandt, 2000). The nature of constructivism means that it will be diverse and dynamic (Bredo, 2000), constructivism thus has many branches of which more popular ones are cognitive, critical, radical, and social, each trend is associated to its influencers such as Piaget (1970), Blumer (1969), Kuhn (1996), von Glasersfeld (1989), and Vygotsky (1978) Dewey (1966a), Freire (1972), Brookfield (1986) and Knowles (1998) etc.. Phillips (2000) was among authors pondered over the many branches of variations of constructivism such as individual constructivism vs. cultural/social constructivism and we will revisit some key ideas of constructivism movement.

Piaget and Vygotsky contributed to early constructivism with their cognitive development theories (Slavin, 2000) however, due to the complexity of their research and their work were in French and Russian respectively, their research did not gain recognition until 1950s and 1960s (Fischetti and Dittmer, 1996). Piaget proposed two mechanisms through which learns construct knowledge i.e. accommodation and assimilation. Assimilation refers to the activity to incorporate new experience seamlessly into existing one while accommodation refers to the process aligning internal state of mind with external forces. This also refers to learning from failure. Both processes point to internalization of new experience as mechanism to construct knowledge. Vygotsky went beyond individual learning and argued that learning happens by interpersonal (interaction in social environment) not intrapersonal (internalization) like Piaget. Vygotsky 'idea placed emphasis on the wider societal, cultural and environmental make-up. Piaget' principle of individual learner and intrapersonality was categorized as personal constructivism while Vygotsky' principle of social-cultural environment and intrapersonality was categorized as socialcultural constructivism. Those are the 2 main branches of modern constructivism. On the individual constructivism side, Von Glasersfeld (1989) who believed that because each of us has our own construct of knowledge based on our own experience and because knowledge doesn't reflect reality which practically means thus we don't share knowledge and knowledge is understood only by its constructor. On the socialcultural constructivism, learning is believed to happen during collaboration (Dillenbour, Baker, Blaye and O'Malley, 1995) in any social or contextual settings (Bliss *et al.*, 1997) while others require certain situational social or contextual settings (Lave. 1997). Of course, there are other twists of constructivism that has complemented in many ways.

Dewey (1966) saw the inherent weakness of objectivist that it completely forget about learners 'individuality and experience. His constructivism calls for recognition of learners 'past experience as a source for construing knowledge, consequently education built around past experience once acquired will enlarge personal experience. He viewed teachers' role as a source of inspiration not a source of knowledge transmission.

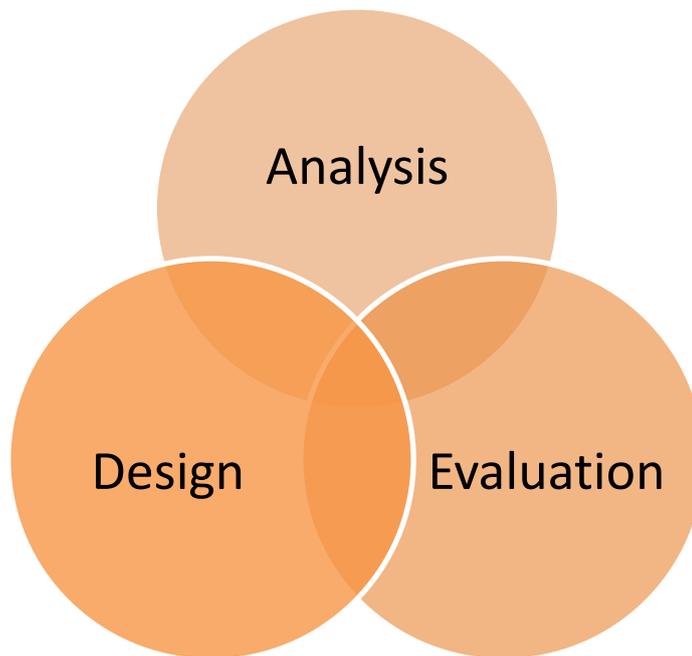
Influential Brazilian educator Freire (1972) gave emphasis on dialogue as main interaction form that foster knowledge. Through dialogue, he argued work with others in equal settings. Also by conversation, people enhance community and build social capital. Additionally, he voiced concern for the oppressed people in society and calls for special pedagogy with a sense of consciousness. He compared objectivist education to that of "banking education" in which "instead of communicating, the teacher issues communiqués and makes deposits which the students patiently receive, memorize, and repeat" (1970, p.53). His work is today widely cited especially in Latin America, Asia and Africa.

Knowles (1998, 67) argued that a large amount of adult learning is informal and experience and that experience, context and environment would help to construct knowledge while curriculum means conformity.

Brookfield (1986) identified two preconditions for learning: one is freedom and the other is autonomy.

### 3.2.2 How a course was designed with constructivism pedagogy

Again, we explore the process of planning a similar hypothetical course "*Telecommunications for learning and instruction*" outlined by Vrasidas (2000) this time guided by constructivist paradigm.



*Figure 2. The process of delivering a course in constructivist approach consists of three major phases; Analysis, Design and Evaluation, which are iteratively carried out in a spiral process.*

The process of delivering a course in constructivist approach also consists of three major phases as in objectivist i.e. Analysis, Design and Evaluation. The organization and engineering of 3 phases however are much different. Three phases does not happen in a linear process with one have to be started and completed before the next, parts of analysis will be carried out following by some elements of design and evaluation, the process happens in a spiral model building up part-by-part until completion.

In content analysis, a teacher chooses to set some guidelines but do not have an arbitrary cap on content firstly because teacher knowledge could be found in more than one academic field and secondly, in the era of information age of mass knowledge creation and distribution, learners would be able to browse freely extensive resources available to them and selectively filter what is relevant to them. (Dede, 1996; Jonassen,1996). Also if constructivist paradigm is employed then learners will be encouraged to take charge of their own construction of knowledge therefore it would not practical to set a cap. A teacher also analyses learners not just his previous knowledge but also his learning style and preferences as to human cognition theories such as: Kolb’s Learning Styles, Dunn and Dunn Learning Styles Hill’s Cognitive Style Mapping, Grasha-Reichman Learning Styles or Gregorc Learning Styles among others (Ayersman & Minden, 1995). A constructivist teacher must guide students to have the expertise to make judgment about their learning ( Bednar, Cunningham, Duffy, & Perry, 1992; Brown et al, 1989; Resnick, 1987). Concept of learner autonomy is defined simply as “the ability to take charge of one's own learning” or “a matter of the learner's psychological relation to the process and content of learning” or “a situation in which the learner is totally responsible for all the decisions concerned with his [or her] learning and the implementation of those decisions”. In essence, when a learner is totally responsible for learning, leaner autonomy is achieved ([http://en.wikipedia.org/wiki/Learner\\_autonomy](http://en.wikipedia.org/wiki/Learner_autonomy))

Then comes the design phase, if a teacher does not know what content of the course would be within in 10 or 12 weeks, how would it be possible to design course activities in advance? Constructivist works not by analysing how specific items and activities fit in the bigger picture but on how the bigger picture could be constructed if learners are to be given the

context and interaction to do so, assessment in forms of tests or assignments should be negotiated by learners to give them the freedom to exercise their autonomy, to provide contexts and interaction through which learners will learn best. Vygotsky's zone of proximal development (1978) is the knowledge that a learner would develop under guidance of adult or during collaboration with more capable peers and is also the gap that a learner otherwise wouldn't fill without help of more capable peers. A good way to organize group-works e.g. discussions or case-study is a teacher would forms groups with diversity where one is more developed than others in different knowledge domains. That way, students can always learn from each other and help others to learn.

Evaluation in behaviorist pedagogy is the process of learners' behaviors observation. Constructivists encourage different interpretations, personal constructions of knowledge; an effective evaluation strategy must evaluate many different personal construct against others. Constructivists encourage personal uniqueness in terms of culture and sociality; an effective evaluation strategy must evaluate personal construct against personal uniqueness. If we take Von Glasersfeld (1989) 'stance that everyone is different thus everyone 'knowledge is different, it would mean there must be as many evaluation strategy as the number of students in a batch. Also constructivists measure not just end-result or knowledge construct but also learners' cognitive process. Cunningham (1992) argued that tests are relevant but not sufficient. Others (Duffy & Cunningham, 1996; Eisner, 1994; Jonassen, 1992b) call for portfolios and authentic assessment. "Evaluation in the *Telecommunications for learning and instruction* course, can be based on information gathered from the following: student reflection papers, student participation in online discussions, student moderation of online discussions, student self-reflective journals, weekly assignments, team projects, student presentations, observations and interviews with students, and student evaluations of their peers' work. Reflection papers and student's self-reflective journals can provide evidence about students' thinking and learning processes. Students are asked to reflect on the process they followed while solving a problem, or while developing a proposal. More insights on students' knowledge construction processes can also come from discussions and interviews with students.

Learners should be evaluated while attempting to solve real world authentic tasks, which are meaningful in the context they appear." (Vrasidas,2000). In constructivist environment, students develop their own reflection of reality in their state of mind, therefore, it would also be reasonable to give them the autonomy not just in organize their learning but to evaluate how well their plan works out. Lake and Tessner (1997) and Posner (1995) added that evaluating their own work would make them more responsible for theirs. Constructivists concentrate on the learning process thus evaluation should reflect its essence. This would in the form of not one-off at the end but continuous evaluation throughout the course. The downside of constructivist assessment is that it would be more difficult to control a variety of issues such as effectiveness, fairness; and delivery, financial and time constraints. (Linn, Baker, and Dunbar, 1991)

### 3.2.3 Constructivism pedagogy comment

The dynamic and changeable nature of constructivism has blossomed varied ideas and interpretation while there are also overlapping territory similar in conceptualization but different in representation. I tend to agree with Cobb (1994), for finding common ground between individual and cultural-social constructivism that they don't cancel out but rather complement each other. Mathematical learning in his view could be seen as a twofold process of individual internalization of knowledge and of enculturation into the mathematical practices of wider society". Learning therefore is a process of first active participation and interaction and also of internalization ongoing inside the learner 'active state of mind. I also tend to step a bit away from radical constructivism of unique experience means unique

knowledge and unique reality. I believe that individual are unique that is why they are individuals but at least on many facets of reality and knowledge at least more than one learners can share similarities. Also I doubt that if individual knowledge and reality is too different it may not be meaningful because it will not be accepted but its sole constructor.

## **4 “DISTANCE” IN DISTANCE LEARNING**

### **4.1 Why “distance” in distance learning is important**

As revealed in Chapter 2, learning theorists have explained how people learn in usual classroom environment and from that understanding, have put forward ideas as well as tested how to organize learning more effectively.

The difference between learning and distance learning of course is in “distance”. If distance learning is similar to learning except that you learn from distance a view shared by Honeyman, M and Miller, G (1993) then certainly what makes good learning also makes good distance learning. If however, “distance” in distance learning adds new dimensions or change the nature of learning then we have to compare between two phenomenon “learning” and “distance learning” and what makes good “learning” may not necessarily makes good “distance learning”.

Part 1 of my thesis introduced to and looked at the historical context of distance learning from the day printed teaching materials were posted to learners far away from their University to modern e-learning projects streaming video lectures to students via the Internet. Changes to distance learning seem to be about technology and not pedagogy but there was one researcher whose long career was devoted to distance learning explained the essence of distance in distance learning more convincing than any others. The educator Moore attempted for the first time to define distance education in 1972 and later articulate a theory which he later called transactional distance theory looking at the inner working of distance education (1980). Today, he remained a prominent theorist in distance and electronic education. Before that, “the debate on whether or not distance education is a separate field has distracted practitioners and researchers, and confused administrators, for years” (Lowell, 2004). Moore’s transactional theory was the turning point of distance education shifting from organization or structure to transaction or teaching and learning Garrison (2000).

### **4.2 Moore’s theory of transactional distance**

During the World Conference of International Council for Correspondence Education (ICCE) 1972, Moore categorized “two families of teaching behaviors” in “universe of instruction” i.e. "contiguous teaching" and "distance teaching." He continued to explain distance teaching "instructional methods in which the teaching behaviors are executed apart from the learning behaviors,.. so that communication ... must be facilitated by print, electronic, mechanical, or other devices" and argue that “... we should direct resources to the macro-factors: describing and defining the field; discriminating between the various components of this field; ... building a theoretical framework...” Distance in education has long been seen as the physical separation of students and teachers and nothing else. Would distance be described in terms of pure physical separation which means that the more distant the physical distance between students and teachers the more distant the education will be? Especially distance is the difference between education and distance education, the need for understanding the distance concept would be huge. A study in United Kingdom by Kelly and Stevens (2010) showed distance is the problem in distance education. A number of students think of distance learning not as education of flexibility and quality but as “isolated learning”, or “remote learning”. Only by understanding what distance means, we would be able to construct new distance learning.

Moore proposed what he called transactional distance to explain the distance in distance education. Transaction in distance education is understood as the interaction between teachers and learners in a learning environment separated physically. Separation according to Moore will lead to misunderstanding between teacher and learners and that the space of misunderstanding in terms of psychology and communication is what Moore called “transactional distance”. It is notable that the misunderstanding space also exists in face-to-face environment so in a traditional learning environment transactional distance also occurs. Transactional distance is a dynamic rather than a fixed-value function depending on three variables. The first 2 variables are dialogue and structure which denotes pedagogy and the last variable is learner autonomy.

#### 4.2.1 Dialogue:

The concept of dialogue and interaction is very similar and are used interchangeably but Moore added some vital variation between them two. Dialogue “is used to describe an interaction or series of interactions having positive qualities that other interactions might not have. A dialogue is purposeful, constructive and valued by each party. Each party in a dialogue is a respectful and active listener; each is a contributor, and builds on the contributions of the other party or parties 'dialogue' is reserved for positive interactions, with value placed on the synergistic nature of the relationship of the parties involved. The direction of the dialogue in an educational relationship is towards the improved understanding of the student” (Moore, 1997). Teacher-learner dialogue in this case has characteristics of interaction in constructivist environment that we explored above; in fact, Moore once mentioned dialogue as “constructive interaction” in a conference in 2006. Also we can say dialogue in Moore’s transactional distance is most compatible in a constructivist learner-teacher relationship. Objectivists neither reject nor encourage dialogue while Socratic teachers would simply guide students to find the outer truth (Boghossian, 2006) Constructivist dialogue on the other hand is interplay and negotiated interaction between teacher and learner where a teacher inspires students to learn.

##### 3.2.1.1 Dialogue in distance education

In distance learning however, construct of dialogue is much more difficult to attain. In distance learning programs where instruction is in the way of broadcasted audio/video programs or instructional textbooks, there is no dialogue at all, teachers do talk to intended audiences but learners won’t be able to respond. Other forms of instruction allow dialogue to be constructed, programs where teachers and students communicate by post allows dialogue but not synchronously. By definition, more dialogue leads the less transaction distance, and better dialogue has been made possible through latest ICT developments such as emails or web applications which are cheaper, spontaneous and more interactive. But technology alone can’t solve all problems of lack of dialogue. Factors such as teacher’ pedagogy style, learners ‘personality or the nature of the course would mean sufficient dialogue should happen. If a teacher pursues a objectivist approach then dialogue direction would be shifted much toward the a teacher’ end, otherwise if a teacher favors constructivist teaching then dialogue reciprocity would be encouraged. If learners are more active and participative then dialogue would be more fruitful else a teacher has to take up direction. Furthermore, there are courses that require more dialogue than others e.g. a postgraduate course in social sciences offer more interplay and dialogue than a basic mathematics or natural sciences course. Those are the factors that affect dialogue that Moore (1997) pointed out, he also plausibly said about the objective of introduction and usage of dialogue is to overcome transaction distance where exists not for the sake of dialogue.

#### 4.2.1.1.1 Moore's 3 types of interaction theory

Dialogue is made up of 3 kind of distinct interaction in distance education i.e. learner-content interaction, learner-instructor interaction and learner-learner interaction.

##### 4.2.1.1.1.1 *Learner-content interaction*

Learner-content interaction according to Moore is the fundamental type of learning activity in distance education. It is when students interact with content, digest content and learn. It is when a student receives instruction in form of pre-written content from an expert. Holmberg (1986) refers to this kind of interaction as learners talk to themselves about the content. In less interactive content, interaction is only one-way but more interactive software and web application e.g. Moodle (Rice, 2008) would at least allow some extent of dialogue

##### 4.2.1.1.1.2 *Learner-Instructor Interaction*

The second type of interaction is seen as essential by many teachers. The role of the instructor is to develop contents and engage learners during the teaching period through lectures, seminars and other teaching activities. If a teacher employs an objectivist approach interaction remains interaction where teacher leads the interaction direction, if a teacher employs a dynamic constructivist approach, then interaction becomes dialogue with exchange of ideas and communications and negotiation regarding content, curriculum and evaluation. In a constructivist environment, learner-instructor interaction is a fruitful co—operation process with higher frequency and intensity.

In distance education, learner-instructor interaction takes place in the form of synchronous communication via webcast or live chat or asynchronous communication via post, email or forum discussion.

##### 4.2.1.1.1.3 *Learner-Learner Interaction*

Learner-learner interaction is a particular challenge in distance education where interaction is inter-personal among peers in the cohort. Learner-learner interaction is largely ignored in objectivist learning but is a major construct in constructivism. Vygotsky's zone of proximal development (1978) stressed the advantage of learner-learner interaction, without collaboration with more capable peers, the zone of knowledge otherwise would have capitalized will remain empty. In recognition of learner-learner interaction' vitality, Phillips et al. (1988) taught their students the skills to make interaction more valuable. Again fruitful interaction will lead to learners' dialogue.

## 4.2.2 Structure

Structure is the second variable that affects transactional distance. Moore constructed structure by analyzing many "independent study" programs variously referred to as open learning, blended learning, flexi-learning, distributed learning, tele-learning or e-learning. The list includes programs delivered by TV and radio, correspondence, telephone, recorded tapes, CBT and some programs with elements of face-to-face as well. Among those programs some are more adaptive to individual learners or more individualized than others. The more individualized are the ones with elements of instruction and learning on campus interacting with others. While the least individualized are those broadcasted on TV and radio signal or pre-recorded tapes as well as in the form of computer software where the program is structured beforehand and there is no way to change its structure in real-time.

Structure and individualization are inversely dependent, more structured programs are less individualized and vice-versa. Again communication technology is a determinant factor in the level of structure. Broadcasted TV program for example is highly-structured with no teacher-learner dialogue while webcast lecture would involve more dialogue with little planned beforehand structure. Again factors such as teaching style, learner and teacher preferences result in high or low structured program. Objectivist teachers would tend to over-construct program and make it too rigid which potentially limit dialogue.

Moore's theory implied about the relationship between structure and dialogue and Saba & Shearer (1994) independent from Moore, confirmed that structure and dialogue are inversely interdependent i.e. more structured leads to less the dialogue, and vice versa.

Based on Moore's transactional theory, the aim of distance education is to make distance a space as little as possible. In less distant programs, more dialogue is conducted between teachers and learners and a relative open structure caters for flexibility. On the contrary, distant programs, allows little dialogue and tight structure where content and tasks are pretty much decided by a teacher.

### 4.2.3 Learner autonomy

In programs where distance is big, learners must step-up to take many learning responsibilities. Without dialogue, which also means more structure with predefined tasks and guidance, learners have to be more autonomous. Developing program with little distance is a highly complex task which asks for an optimum level of structure, dialogue and learners' autonomy. More synchronous interaction via webcast or chat would stimulate more dialogue while structure must be relatively open to be flexible and not too rigid to allow small room for negotiation.

Pedagogy plays also a role here. If a teacher takes a constructivist approach and is able to engage learners in a constructivist environment where so much interaction is going on between teacher-learners and curriculum is reduced to contain major topics with a lot of materials and tasks and even assessment could be negotiated between learners-teacher, he/she would be able to raise learner's' autonomy level, reduce structure and increase dialogue. The distance would be much limited.

### 4.2.4 Review of transactional distance theory

Moore (1993) view distance in distance learning not as a physical concept but a pedagogy one defined as the "relationship of teacher and students separated by time and/or space" which can be made up by "such elementary constructs of the field- namely, the structure of instructional programmes, the interaction between learners and teachers, and the nature or degree of self-directed ness of learners". Distance of distance learning is the measure of separation between teachers and learners that they both have to cross. What he offers is the three constructs that make up transaction distance or the separation between teachers and learners and the interplay of those three constructs. Moore acknowledged distance of distance learning also exists in face-to-face education and distance education is a subset of the universe of education. It is hard to argue otherwise because three constructs: structure, interaction and learner' autonomy are mutual to both distance and classroom education.

## **5 CRITIQUE OF THEORIES OF DISTANCE LEARNING**

### **5.1 Distance learning vs. learning**

Theory of transactional distance learning pointed out that distance learning is a subset of learning and view distance as a phenomenon mutually exist in both classroom and distance learning environment except that for distance learning the distance becomes “sufficiently significant” (Moore, 1989) It is important that distance learning is a subset and of inherent similar make up to the learning universe.

There are two interesting ideas that we can draw from that. Optimal distance learning is achieved when transactional distance between teacher and learner is reduced an extent similar to that of face-to-face education and what makes effective learning also makes effective distance learning.

### **5.2 Analysis of learning theory**

Education can take many forms, in reading intellectual magazines, in watching scientific programs or discuss over a topic. Education also happens when we collaborate and work on similar piece of works, we learn from each other, we are a teacher to others and to ourselves. Objectivism pedagogy is the first pedagogy paradigm while constructivism pedagogy was only coined as a new concept since 1950s and practiced recently. In many ways, these two pedagogy schools are distinctly contrasted.

First, objectivist teaching paradigm strips away personal experience, uniqueness and background, each learner is just another learner, another unit the education process and thus applies a one-size-fit-all teaching technique. While constructivists paid attention and adapted their teaching to suit learners. Freire (1972) was famous for “education for the oppressed” or marginalised groups in society. Ethnographical researchers like Nguyen et al. (2006) studied pedagogy arrangement that suits cultures from West to East. Constructivists, based on human cognition theory, came up with many learning styles classifications such as: Kolb’s Learning Styles, Dunn and Dunn Learning Styles Hill’s Cognitive Style Mapping, Grasha-Reichman Learning Styles or Gregorc Learning Styles among others (Ayersman & Minden, 1995).

Second, objectivist approach doesn’t encourage students to see different facts and interpretation or ways to approach problems but to look for a ready-made solution. Also when teachers have the mandate to set curriculum, to decide what is true and what is good, to transfer knowledge to students like water pouring down, the most students will know is as good as their teachers, while that may be good enough or more than enough in many cases, it would mean death to innovation and creativity which are forces driving us forward.

A summary of differences between constructivist and objectivist teaching is presented by condensing vast literature to few key points in the table on the next page:

**Table 1. A summary of differences between constructivist and objectivist teaching**

<i>Objectivist</i>	<i>Constructivist</i>
Knowledge is imparted from content providers i.e. teachers to content consumers i.e. learners	Knowledge is constructed by learners in individual learners' mind based on her/his previous socialcultural experience during interactive learning process in a collaborative learning community
Teacher has the expertise and transfer expertise	Teacher has the expertise and guide students to think in an expertise way.
Teacher have the directive role, students have the compliant role	Teachers- students have interactive relationship, teachers is the source of inspiration
Knowledge is static reflection of reality	Knowledge is among many interpretation of reality based on past individual experience thus evolves and changes
Students-content and students-teacher interaction accounts for much of learning activity, very little peer interactivity	Equal distribution of student-content, students-teacher and students-students. Group-work is a major activity.
Curriculum design is based on the concept of analysis. Curriculum consists of separate items and activities, and build up relatively to big concepts	Curriculum design is based on the concept of synthesis. Curriculum emphasizes big concepts and extend to include smaller constituent parts
Curriculum is fixed before the course and designed by teacher.	Curriculum is not fixed but expand and change to cater individual negotiation acting as an expert looking for relevant knowledge in many disciplines
Learning by repeating known best ways of doing specific tasks designed by a teacher	Learning is inventive process through individual exploration and leveraging in group work with more capable learners
Assessment is done by behavioral analysis i.e. correctly repeating tasks. Assessment is a one-off test at the end of the course	Assessment is a continuous process to see how students develop viewpoints and relate to past experience.

Of course, there are certain similarities or overlapping between these two schools. The leading role of instructors is acknowledged, the interaction between teachers and learners, the learning targets and curriculum etc.

The essential difference of Constructivism as opposed to objectivism is the ethos that interaction in a social context or collaboration in a learning community as a mechanism to foster individual learning. Freire (1972) stressed the role of dialogue rooted in equal settings will reinforce knowledge building process. Vygotsky emphasized the role of interaction in education in his concept of “zone of proximal development” (1978) which is the knowledge that a learner would gain by interacting with more capable peers. They both argued for more interaction between learner, content and teacher in education. Vrasidas (200) designed a hypothetical university course using constructivism approach demanding learners to be proactive in handling contents Interaction between learners was seen as an important part of fostering knowledge in constructivism. Without dialogue and interaction there could be no knowledge that is the ethos of constructivist approach. Constructivist is also the pedagogy favoring flexibility in teaching organization and high individualization curriculum. Each learner reflects on their own experience and constructs their own knowledge. Each learner would contribute to the curriculum, learning outcomes, assessments and speed of study etc.

Perhaps more important is the pure notion of individual knowledge construct in constructivism. If interaction is the environment that nurtures knowledge building, the mandate to construct knowledge lay solely on each learner.

## **5.3 Moore's transactional distance theory**

### **5.3.1 Moore's theory and objectivist learning**

Influenced by Constructivist approach, Moore's theory is incompatible with objectivist one. In objectivist education, dialogue is reduced to mostly monologue between teacher and students. Content-learner interaction is also reduced to one-way street because content is fed to learner through curriculum design not actively sought by learners. Lastly, learner-learner interaction in objectivist approach is seen a surplus. In terms of dialogue, objectivist approach has failed distance education. Structure is seen as the flexibility of the program to cater for individualization. Again objectivists with its planned design, rigid structure caters for nobody but the teacher allows very little room or flexibility of education structure. The last indicator of success in distance education is learner autonomy. Learner autonomy can overrides both dialogue and structure or when learners take full autonomy, they can effectively learn without dialogue or structure. Objectivist teachers don't support autonomy rather favor compliance.

### **5.3.2 Moore's theory and constructivist learning**

Moore's theory of transactional distance is published in its complete form in 1993 in which he credited the concept of "transaction" to American constructivist educator John Dewey simplified by Boyd and Apps (1980) "connotes the interplay among the environment, the individuals and the patterns of behaviours in a situation". Transactional distance is therefore more than mere physical separation between learners and teachers as well as the learning environment and Moore defined it as "the psychological and communication space" that developed as a result of distance education settings. As other Constructivist educators, Dewey viewed knowledge from the lens of interactivity between learners and environment through which learner develop experience and construct knowledge. The whole process of learning is viewed as a transaction.

Moore developed three indicators of transactions in distance education: dialogue or the communicational interactivity of learner-teachers-contents, structure or the flexibility of organizing the course curriculum, delivery and evaluation and finally learner autonomy or the extent of learners to influence learning activities.

Moore defined them as following:

- Dialogue is purposeful, constructive and valued by each party. Each party in a dialogue is a respectful and active listener; each is a contributor, and builds on the contribution of the other party or parties... The direction of a dialogue in an educational relationship is towards the improved understanding of the students (p. 24). Dialogue is a construct derives from the teacher-learner relationship in constructivist teaching environment where teachers direct and not dictate in order to guide students to improve towards understanding
- Structure expresses the rigidity or flexibility of the program' educational objectives, teaching strategies and evaluation methods. It describes the extent to which an educational program can accommodate or be responsive to each learner' individual needs. Structure is similar to instructional design conceptually tilted toward the constructivist approach of flexible curriculum design, delivery and evaluation methods.

- The third Moore element learner autonomy even though not credited to Dewey was heavily influenced by his thinking. Constructivist thinkers such as Piaget (1970), Blumer (1969), and Vygotsky (1978) all mentioned the role of environment and learning is the result of interaction of person within the environment. But it is Dewey who proposed thinking as a means through which learners controls and guides this interactivity and humans have an active role in constructing knowledge not just an a quiet observer of the environment. The active role of learner is the core to learner autonomy.
- 

### 5.3.3 Analysis of Moore's theory:

The relationship between dialogue, structure and the transactional distance can be explained in the graph below. Transactional distance and dialogue are inversely proportional to each other while transactional distance and structure is directly proportional to each other. The approach to increase dialogue and decrease structure to decrease transactional distance is can be directly traced back to our analysis of constructivist learning proposing flexible curriculum design and foster interactivity between learners – teachers - contents.

**Typical programs by technology used** (Moore, 1972, 1973)

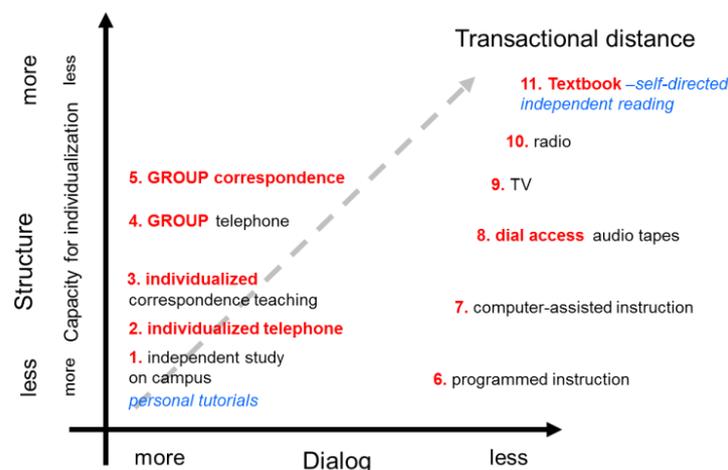


Figure 3. Typical programs grouped by technology used.

Source: Moore (2007) presentation at the conference of European Distance Education Network.

Obviously, transactional distance and autonomy are directly proportional to each other, increased transactional distance requires equal increased amount of autonomy. In other words, the more autonomous a learner is, the more distance is reduced. Furthermore, learner autonomy can also counter flexible structure and less dialogue. Again this overlaps with Dewey's view that learner autonomy control learning in a transaction.

The graph on the next page demonstrates the role of autonomy to counter distance in a transaction.

### Autonomy and transactional distance

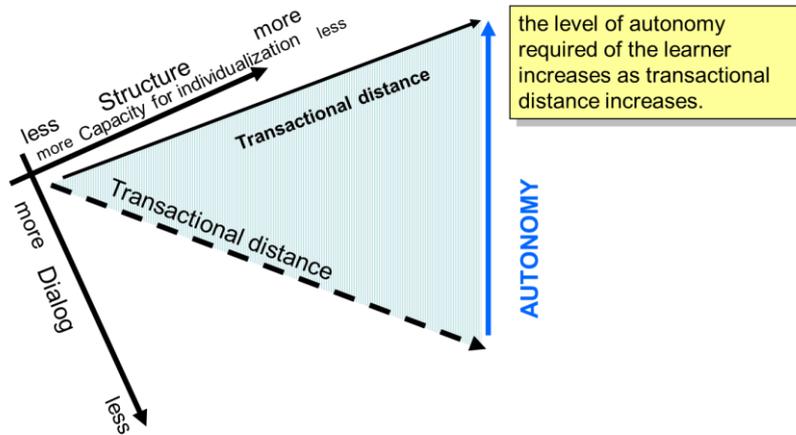


Figure 4. The role of autonomy to counter transactional distance.

Source: Moore (2007) presentation at the conference of European Distance Education Network.

Empirical studies of Moore's theory (Saba and Shearer, 1994) (Saba, 1998) (Chen, 2001) to verify it has varied in conclusion. Critiques such as Gorsky and Caspi (2005) also question uncertainty over an operational definition of "a psychological and communications gap, a space of potential misunderstanding between the inputs of instructor and those of the learner" - transactional distance and its three tenets. The functions of transactional distance = (dialogue, structure, autonomy) which appeared mathematical apparently is not much so.

Without delving into details on incompleteness of Moore's theory, it is still widely-prominent theory in distance learning. Also while empirical studies varied in its support for Moore, Moore's theory is based on his observation of distance learning programmes in chronological order: correspondence, audio tapes, radio, telephone, TV, computer-assisted instruction, web-based instruction as well as independent learning on campus. He observed that programmes that facilitate more timely communication and allow more individualization / less structure are more successful. Improved communication comes as a result of telecommunication technologies while structure is a result of enhanced instructions. So while experiments may or may not confirm Moore's contribution, Moore's findings are based on long-term tendency development of distance education.

Because Moore used the term "continuous" "space" or "gap" which I imagined could also be demonstrated as in the figure below. Moving along the more dialogue and less structure dimension, we have low transactional distance, when we moved on the wrong side of either of the axis, transactional distance decrease. The region that has high transactional distance is made up by low dialogue and high structure.

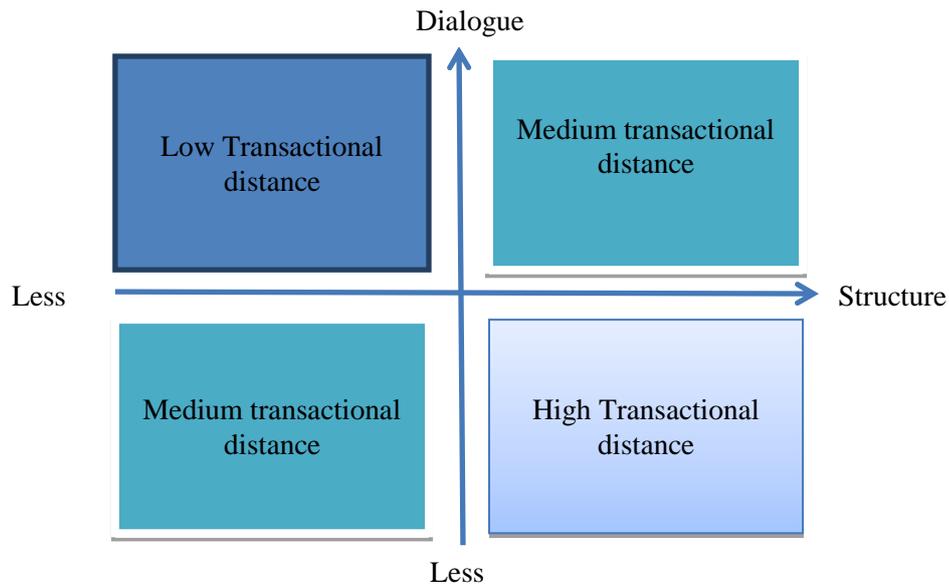


Figure 5. An attempt at visualizing Moore’s theory about transactional distance in relation to more or less dialogue and structure in a course.

Arguably, Moore’s theory derives from constructivism-objectivism duality, moving along the more dialogue direction, more dialogue means more “purposeful, constructive conversion” with “respectful and active listener” contributing “towards the improved understanding of the students”. Similarly, constructivist teacher will take less of an authority role of transferring knowledge to guide students to exploring towards improved understanding. Moving along the less structure dimension is also similar to moving towards a flexible curriculum and synthesis idea of constructivism away from rigid and fixed curriculum of Tyler rationale.

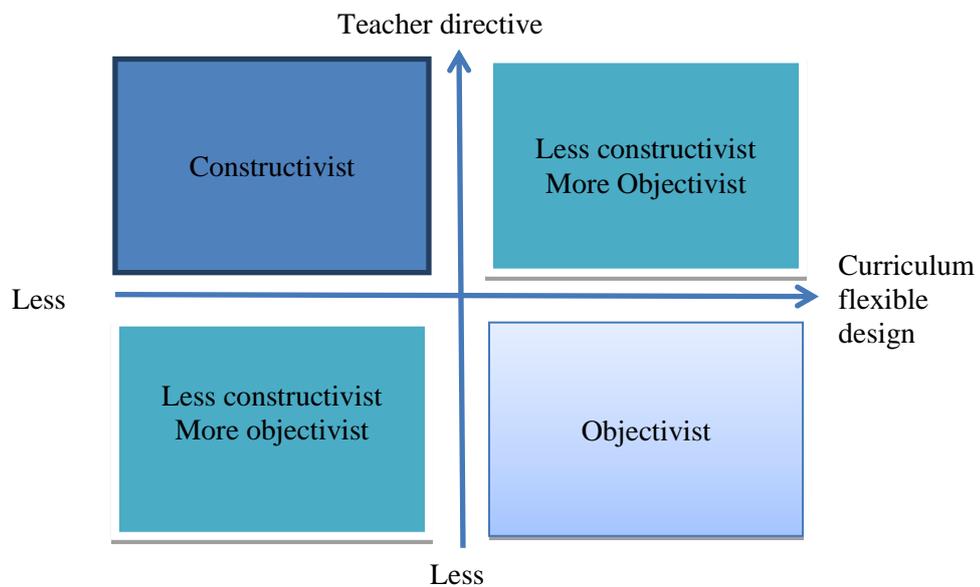


Figure 6. An attempt at visualizing constructivist versus objectivist approaches in relation to more or less teacher directive and curriculum flexible design.

### 5.3.4 Moore's theory and the role of technologies

Pedagogy and framework can help to organize better distance education, but it is telecommunication and multimedia technologies that make distance education possible. Moore has been unequivocally clear about the role of technologies but he sought technology solutions to his transactional distance problem not the other way around (Cappelli et al., 2009). In such a field weakened by "surprisingly few strong pedagogical ideas and constructs" Svensson and Otslund (2007), Moore has been far-sighted seeing technologies not only as facilitating "communication media" but also influence "design of courses" and cater for "selection of training of instructors and learning styles of students" (1993)

#### **Technologies and Dialogue**

On the role of technologies on dialogue, Moore commented "the nature of each communication media has direct impact on the extent and quality of dialogue between instructors and students". He categorized communication media based on its ability to facilitate dialogue. Television, audio-tape or self-taught books will lead to teacher-learner "no dialogue" simply because students could not respond back to teachers. Correspondence will allow for teacher-learner dialogue but much less spontaneous than real-time video conference or class-room dialogue. He believed that synchronous communication channels such as: live media conference by allowing "more intensive, more individual, more dynamic dialogue" are more effective in closing down transactional distance than asynchronous ones such as: recorded media. Furthermore, the more interactive or responsive the communication channels are, the more dialogue can be built up and the less transactional distance will be.

#### **Technologies and Structure**

Structure of a programme is also influenced by the communication media employed, reusing the examples of programmes above, Moore pointed out that television or audio-tape or self-taught books also allow for no structure flexibility because content and structure is predetermined regardless of learners' needs. Programmes employing technologies such as live media conference can allow a lot more flexibility of instructors to learners' questions and evaluation submissions.

#### **Structuring instructional processes**

Moore further drill down on the concept of structure by outlining 6 structuring instructional processes

##### *5.3.4.1.1.1 Presentation*

Presentation refers to the way information and knowledge is presented to learners. Digital contents such as computer assisted learning programs which can be updated regularly are more accessible and can be easily updated

##### *5.3.4.1.1.2 Support of the learners' motivation*

Teachers have to stimulate and maintain learners' interests during the course via feedback or stimulation techniques in teaching materials as well as personal dialogue

##### *5.3.4.1.1.3 Stimulate analysis and criticism*

Analysis and criticism are high order cognitive skills that learners in higher education have to develop. Students must be encouraged to challenge ideas and information presented to them via teleconference discussions.

##### *5.3.4.1.1.4 Give advice and counsel*

When students need advice and counsel, teachers can help via postal mail, telephone or email

5.3.4.1.1.5 *Arrange practice, application, testing and evaluation*

These ensure that students have picked up the information presented to them.

5.3.4.1.1.6 *Arrange for students' creation of knowledge*

This is highest level of education that requires rich dialogue between teachers- learners

**Moore's theory and the new wave of Web technologies: Web 2.0**

Moore is equally concerned about pedagogy as he is about technologies and have incorporated into his theory how technologies changes have influenced the way distance education has been for the better. His theory is still the prominently relevant today but his analysis of technologies roles have not yet studied the latest explosion of technologies in the post-1993 age: the Internet, the booming Web especially the new Web 2.0

The explosion of Web 2.0 services have been facilitating rich dialogue among peers, teachers and learning materials, allowing individualization to educational settings and structures. Also Web 2.0 lowers the barrier to participation and content generation thus would encourage learner autonomy.

## 6 WEB 2.0

The author has mentioned technologies have helped distance education to close down the distance in distance education. In this chapter, the author will explore the power of Web 2.0 services and argue that Web 2.0 naturally lend itself to Constructivist paradigm. A case study will be introduced where Web 2.0 has been used to leverage to enhance distance learning following a broad constructivist consensus. Moore's theory which derives from constructivist teaching, it is Moore's credits to pioneer clear benchmark, operational variables and functions of "transactional distance" a variable indicating how effective distance education is. Thus Moore's theory is suitably employed as a tool to evaluate the impact to technologies to reduce transactional distance.

### 6.1 Distance learning in the Information Age

Online courses are dominantly organised through learning management system (LMS) also known as course management system etc. provided by commercial education-technologists such as WebCT, Blackboard, Itslearning or SharepointLMS etc. or open-source communities such as Dokeos, ILIAS, Moodle or Sakai. From a teaching viewpoint, LMS helps to organise course contents into lessons or lectures, quizzes, tests and discussions (<http://www.elearnmag.org/subpage.cfm?article=29-1&section=articles>) From a wider managerial viewpoint, LMS also caters for courses, programmes and contents administration, education activity reports and documentation as well as registration and record-keeping. (Ellis, 2009) LMS can also be hooked to University-wide information systems for integration purposes. Today, LMS also has social networking or web 2.0 features such as: blogs, wikis, bookmarking, podcast or RSS etc. (<http://www.elearnmag.org/subpage.cfm?article=29-1&section=articles>)

Many efforts have been diverted to leverage the power of Web 2.0 in education but the tendency to see Web 2.0 as "hype", to see Web 2.0 as a platform mainly for entertainment and sociality thus not suitable for serious academic activities (Cappelli et al., 2009) wouldn't be diminished quickly. My encounter to those would be this: if President Obama can win one of the most dramatic presidential campaigns in world history and has administered a country thanks to a platform of Web 2.0 there is no reason why given the same technologies, we couldn't be able to create and run successful university courses. To be fair, criticism has been justified due to the lack of extant serious attempts to establish pedagogic research in incorporating Web 2.0 into education (Fountain, 2005). Web 2.0 tools were also used as "a solution looking for problem" (Cappelli et al., 2009). Svensson and Otslund (2007) raised concerns about "there are surprisingly few strong pedagogical ideas and constructs that are communicated across distance educational institutions".

In many ways Web 2.0 could mark a new era to digital education if all its powers could be realised and harnessed. But that would require very good understanding of conceptualisation or principles of web 2.0 as well as having the savvy to apply Web 2.0 artfully into the teaching and learning process.

### 6.2 6 characteristics of Web 2.0:

The term 'Web 2.0' was officially coined in 2004 by Dale Dougherty of O'Reilly Media (O'Reilly, 2005a) and was made famous by Tim O'Reilly the founder of the company when he wrote an infamous paper, "What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software". O'Reilly set out 7 principles distinct to Web 2.0:

- 1) The Web as platform
- 2) Harnessing collective intelligence
- 3) Data is the next “Intel inside”
- 4) End of software release cycle
- 5) Lightweight programming models
- 6) Software above the level of single device
- 7) Rich user experiences.

Anderson, (2007) adapted those 7 principles to 6 “big ideas” explaining why Web 2.0 has been so impactful for education. Those 6 big ideas elucidate how Web 2.0 creates a global information network with very strong social dimension for collaboration, contribution and community

- 1) Individual production and User Generated Content
- 2) Harness the power of the crowd
- 3) Data on an epic scale
- 4) Architecture of Participation
- 5) Network Effects
- 6) Openness

## 6.3 Web 2.0 services

A few projects incorporating Web 2.0 into education have been experimented. Web 2.0 applications that have been used quite frequently and widely including blog, microblog, wikis, multimedia content sharing services e.g. podcasts and vodcasts, tagging etc, and content syndication. The fast pace of Web 2.0 means that these services have new capabilities added to it quite frequently however the core of the services are pretty mature having been used for few years. (Anderson, 2007)

### 6.3.1 Blog

A blog is a simple personal website consists of entries serving as pieces of commentary, personal diary entries. Entries are listed chronologically and contains many media types e.g. text, images, links, photographs, music, podcasts, vodcasts. Each entry could be tagged with keywords for categorization and meaning-adding purposes. Blogs allow interactive commenting from readers and the process of blog writing and commenting called “weighted conversation” between entry owner and entry followers (Benkler, 2006).

Micro-blog as its name suggests is blog of smaller scale. Entry content is limited to around few hundred characters consisting of text, images or embedded videos.

[<http://en.wikipedia.org/wiki/Microblogging>, access 12/06/2010]

### 6.3.2 Wiki

A wiki is a webpage or a set of webpages that have two distinct characters: open editing and edit preservation. Open editing means anyone can create, edit, add and delete content of a wiki easily by a web document editor called WYSIWYG (what you see is what you get) editor. Another feature of editing tool is hyper-linking for easy navigation between a set of web-pages both inside and outside of the wiki platform. In terms of content edition, wiki is more flexible than blogs, in wiki each person has an equal right to change content while in blog the owner of the entry remains the right to edit content and followers could only add comments. The second feature “edit preservation” however is distinct to wiki and practically

means wiki can remember all content changes that have been made and allow versioning so that each wiki entry can be roll-backed or roll-forwarded between versions. Two simple functionalities of wikis have made it a robust, useful and transparent collaborative environment. (Kane & Fichman, 2009, <http://en.wikipedia.org/wiki/Wiki>, Accessed 12/06/2010 ).

### 6.3.3 Social bookmark and tag

Social bookmarking systems allow users to create “bookmarks” or references to “favorite pages” and store them online rather than locally and share them among peers. It should be noted that bookmark sharing means references to bookmarks are shared not the content per se like in file-sharing services. Users can also add tags to add meaning to bookmarks so that other web users could guess content of the resources without first downloading them. Tags could be used for categorisation purpose which is more dynamic than rigid taxonomy or traditional folderisation of file system; but more importantly, tagging and tags become a social culture called folksonomy, "the process by which many users add metadata in the form of keywords to shared content". Some bookmarking applications also have more advanced functions such as tags clustering based on user's tagging behaviours or provide web feeds for bookmarks lists so users once subscribed will be aware of new bookmarks as they are saved, shared, and tagged by others. Users can also give rating or comment on bookmarks, import bookmarks locally or export bookmarks externally, forward bookmarks etc. ([http://en.wikipedia.org/wiki/Social\\_bookmarking](http://en.wikipedia.org/wiki/Social_bookmarking), access 12/06/2010 and Anderson, 2007)

### 6.3.4 Multimedia sharing

In this context, the term multimedia sharing is used in a wide purpose to cover many forms of multimedia contents that can be delivered over the Internet. Contents can be distributed live (synchronously) or on-demand (asynchronously) or delivered from one-to-many or many-to-many ([http://en.wikipedia.org/wiki/Streaming\\_media](http://en.wikipedia.org/wiki/Streaming_media), access 22/06/2010). Different content-delivery and content-creation methods lead to different service naming. On-demand sharing video service broadcasted online is referred to as webcast. Web conferencing is a service for conducting online meetings, training or presentation allowing each participant to attend content via Internet. Web conferencing contains many features for distance collaboration of group-work production:

- Live/Streaming video: to broadcast video to participants
- VoIP: to broadcast audio to participants
- Slideshow presentation: to present slideshow and animations features.
- Whiteboard with annotation (for highlighting or marking textual contents)
- Text-based chat with animations or icons: to enable real-time text-chat discussion between participants
- Desktop/Screen sharing: to let participants view all movements happening on-screen of shared desktop.
- Meeting Recording: to record all activities happened during the meeting in video format for playback
- Polls and surveys: to allow presenters to conduct answer polls and surveys

([http://en.wikipedia.org/wiki/Web\\_conferencing](http://en.wikipedia.org/wiki/Web_conferencing), access 12/06/2010)

While most content of Youtube has been has been created and uploaded by ordinary web users, broadcasters like BBC, CNN or CNBC have been created and streamed contents to web users (<http://en.wikipedia.org/wiki/Youtube>, access 12/06/2010).

Podcast is another multimedia sharing popular in the age of Web 2.0, coined in 2004 by combining the popular portable multimedia device iPod with broadcasting. Podcasting is a way for delivering multimedia files mostly audio files but also videos (also known as vodcasts) or pdf or text files to local devices for playback. By using syndication feeds, once subscribed, the content will be automatically downloaded locally without need of users to manually select to play stream content like in the case of webcast (<http://www.law.harvard.edu/about/administration/its/media/streamvpod.html>, access 12/06/2010)

### 6.3.5 RSS and syndication

Ordinary web users go to their favorite websites looking for new contents. That would mean you have to visit every single website each time looking for new updates. The role of RSS is to change the direction of internet browsing, instead of having to visit each websites; you have all the new contents get sent to you. RSS is XML-based data format that contains summary of content, contents, publishing data and metadata. Each information stream is organized into a feed and syndicated to users. Content providers must first set-up feeds, web-users then use a tool called feed reader or aggregator to subscribe to feeds that interest them. The role of feed reader is to check for updates from the feeds every designated period and notify web users (<http://en.wikipedia.org/wiki/RSS>, access 12/06/2010 and Anderson, 2007)

### 6.3.6 Social networking services

Social networking services build on the concept of social networks or social relations to facilitate building online communities with strong personal identity through services such as profiling, email, instant messaging, sharing ideas, activities, interests etc. ([http://en.wikipedia.org/wiki/Social\\_network\\_service](http://en.wikipedia.org/wiki/Social_network_service), access 12/06/2005 and Anderson, 2007)

## 7 WEB 2.0 FOR DISTANCE LEARNING

### 7.1 Analysis

In many ways, Web 2.0 allows for better distance teaching and learning

#### 7.1.1 Web 2.0 and constructivism

Constructivism reflects the role of social interaction (Bliss *et al.*, 1997 and Vygostky) and participation in learning community (Wenger, 1988) or collaboration (Dillenbour, Baker, Blaye and O'Malley, 1995) as a stimulating environment for learners to foster knowledge. The use of Web 2.0 with its distinct collaborative, participatory and interactive nature (Anderson, 2007) as we imagine would lend itself to constructivist pedagogy naturally. Web 2.0 “harnessing crowd wisdom” and “architecture of participation” characteristics provide unique opportunity to build constructivist pedagogy.

<i>Constructivist</i>	<i>Web 2.0</i>
Knowledge is constructed by learners in individual learners' mind based on her/his previous socialcultural experience during interactive learning process in a collaborative learning community	Web 2.0' architecture is that of participation which means that a collaborative learning community is easier established online. Constructivism authors always stress the role of a community learning environment and it is Web 2.0 that allows to build one more effective than previous technologies
Teacher has the expertise and guide students to think in an expertise way.	Web 2.0 communication media are synchronous. It provides teacher and students many channels such as email, voice over IP or video over IP to communicate spontaneously. Teachers therefore can easily guide students from distance
Teachers- students have interactive relationship, teachers is the source of inspiration	Web 2.0 is open, participatory and peer-culture not authority. Teacher-students will enjoy a more interactive relationship through different communication channels that are interactive and mutual
Knowledge is among many interpretation of reality based on past individual experience thus evolves and changes	Web 2.0 harness collective intelligence and therefore allow users to contribute their own individual experience easier and more spontaneous through wiki. Knowledge evolves and changes, wiki is also a lot easier and cheaper to change compared to printed materials.
Equal distribution of student-content, students-teacher and students-students. Group-work is a major activity.	Contents are more interactive and lively with video and audio lectures streaming through the Internet which can be stored on local hard-drives and played back anytime at your convenience. Students can collaborate via email, voice over IP or video over IP to communicate spontaneously. Group-works can be done via wiki
Assessment is a continuous process to see how students develop viewpoints and relate to past experience.	Web 2.0 with synchronous communication tools allow users to easily participate in continuous evaluation process. Wiki will record changes that students to allow reflect on evolving learning process.

## 7.1.2 Web 2.0 and Moore's theory

Kane and Fichman (2009) observed that while there are several projects have studied applying Web 2.0 in corporate settings, efforts into its application in education have been far and few between. Thus they wrote a paper dedicated to deploying wiki in academic Information Systems teaching, research and publication. It was published by MIS Quarterly the top-ranked Information Systems journal

(<http://ais.affiniscape.com/displaycommon.cfm?an=1&subarticlenbr=432>, accessed 15 Apr 2012) Kane and Fichman argued that wikis can create content that could be substantially less expensive, timelier, more flexible and, and, in some instances, even more accurate than traditional textbooks". The most significant way that wiki can be utilized is harnessing content creation. Kane and Fichman's dually backed content harness by bracing faculty edition' role to ensure knowledge correctness and cited studies of (Ball 2007; Kittur and Kraut 2008; Wilkinson and Huberman 2007) that knowledge generated by community is "generally accurate" and its accuracy increase proportionally with the size of the community.

Changes to deliverables and evaluation can create incentives for students to actively engage in content creation such as group projects which students collaborate not via word editor but wiki for example. Group projects wikis will be kept for future cohorts to improve on. The public nature of wikis allows feedback and evaluation from peers as well as instructors. But wiki allow another higher level of collaboration and evaluation. In a process called peer reviews, students of a group are encouraged to review group projects of other groups, feedback to others through wikis and improve their own group work.

Another example of harnessing students' contribution to evaluation process is crowd exams sourcing in which under the general guidelines of faculty, students will post exam questions and answers that they think will be relevant. There is no guarantee that the questions will be selected for the actual exams but 140 students submitted 200 questions/answers out of which a ratio of 1/10 is selected.

Because it is easy to track user' activity as well as version control, it is a lot easier to track individual students' contribution as well as group' contribution compared to traditional word editor.

Other web 2.0 technologies while not analyzed in details were also of benefits to course organization. Through the use of RSS and tagging, online assigned readings can be organized and tracked with ease compared to a word editor. RSS allows live updates and filter of different information sources compared to faculty and students have to go to different websites to manually capture URLs. Blogs were used to interpersonal exchanges compared to community version wiki. Multimedia channels also allow more interactive and more user-friendly.

To sum up experience with using wikis for undergraduate and MBA IS courses, the pair of researchers concluded that the processes that Web 2.0 enables allow for greater teaching and learning and when students actively contribute more to development and evaluation of course content; teachers will provide less of expertise transfer but rather to guide more in discussion.

Overall, in this particular instance Kane and Fichman have effectively promoted wikis to enable many learning activities throughout the teaching process from content creation to delivery, evaluation. The importance of wiki is that without it these activities would be more difficult to organize. We can conveniently argue that wikis as a piece of technologies central to Web 2.0 has helped to reduced transactional distance in education. Dialogue between students and teachers become more frequent and synchronous. Students interact more through group projects and peer reviews. Students actively manage content where the highest

level is exams crowdsourcing. Web 2.0 has also improved structure flexibility. Knowledge instead of delivered in printed textbooks can be created with faculty giving a guideline and students updating frequently on a wikis. Teachers can also motivate learners, counsel and feedback via wikis on students' group works. With the right incentives and wikis, learners are encouraged to demonstrate autonomy in all aspects of learning in creating contents, commenting on assigned readings, working with others and reviewing others' works and most importantly contribute to the evaluation phase via crowd sourcing exam questions. Other experiments pointed to positive results when employing wikis. O'Shea, Baker, Allen, Curry-Corcoran and Allen (2007) concluded that wikis helped students to collaborate more effectively. Benson and Samarawickrema (2007 and 2009) praised wikis for enabling learners to possess a high level of autonomy by influencing in course structure.

Kane and Fichman (2009) actually proposed more than just using wikis for teaching in classroom, they proposed that wikis could and should be used in publication and peer review process of serious research journal as well. While the particular instances of classes and projects they pursued sow seeds for success, other similar ideas have tried and not yielded similar results such as those described in article "The wiki way in a hurry" Te'eni to counter Kane and Fichman. The two main points that Te'eni revealed is that there is no strong underlying theory to back the success of mass crowdsourcing in wikis deployment and there is no empirical data to support strong wikis' positive impact. To be fair, these are also the concerns that Kane and Fichman openly admitted as the needs that IS community has to pick on. MIS Quarterly has picked up the cause of open publication and open peer review to allow public to participate in this idea through the wiki hosted at <https://www.socialtext.net/misq5040/>. We have to acknowledge that wiki is generally transparent and accountable in a sense that it shows who edited what. It is open and when combined with blogs allow powerful mix of community versus personal expression. I visited the website three years after the article was initially published and all editions to the wikis or peer review via blog posts were posted back in 2009. This confirms with Te'eni that to keep the wiki crowd source alive is not always a viable task.

The author of the thesis involved in real-life distance learning course called "Social software and Web 2.0" (Available at: <https://www.educ.umu.se/moodle/course/view.php?id=106>, accessed 22 August 2010). The module was delivered entirely online by Umea University in Sweden during the Spring semester of 2010 academic year. The course lecturers openly admitted to try to encourage students of use of Web 2.0 tools to learn about interestingly a interweaving concepts social software and Web 2.0 in a constructivist way. Most Web 2.0 services e.g. wiki, blog, podcast, social bookmarking or RSS were utilized during the course of study. It was hoped that Web 2.0 services by creating a common collaboration platform would foster interaction among peers and the teaching team, cater for individualization and also promote self-enquiry. " (<https://www.educ.umu.se/moodle/course/view.php?id=106>, accessed 22 August 2010). Each week, students are assigned to learn about one technology of social software or Web 2.0, deploying it, making use of it and evaluate if its add benefits to distance learning process.

The learning environment was centred on a Moodle learning management system hosted on Umea University server available at: <https://www.educ.umu.se/moodle/course/view.php?id=106>. Moodle is a widely popular open-source learning management system and was built to embrace social constructivism pedagogy (<http://docs.moodle.org/en/Philosophy>, accessed 22 august 2010). Most Web 2.0 services were hooked into the core Moodle LMS.

## Learning Management System

The LMS was used as a base for organizing the content of the course or in Moore's model to hold 3 common controls i.e. learning goals control, learning evaluation control and learning execution control. MLS also has many collaborative services such as forum where students can discuss about particular learning topics or feedback facilities about learning and teaching from students. By actively participating in discussion in LMS, students can think more critically, collaborate more effectively and build a virtual learning community among peers.

The screenshot shows a Moodle course page for 'Social software and Web 2.0 (2010)'. The page is logged in as 'Duc Tranhuu'. The main content area is titled 'Social software & Web 2.0' and includes a welcome message, introductory information, registration assignment, forums, and challenges. A 'Previous successful pitches' section lists various topics like 'MUSIC', 'PHOTO', and 'PRODUCTIVITY'. On the right, there is a 'Course tweets' widget showing recent tweets from participants.

### Social bookmarking

The course bookmarks page is available at <http://www.delicious.com/vinn/6IT000+vt091> to serve as a repository holding online resources and engage students to contribute their knowledge to the common repository

The screenshot shows a Delicious bookmarks page for 'vinn's 6IT000 and vt091 Bookmarks'. The page displays a list of bookmarks with titles, dates, and tags. The bookmarks include 'Dictionary Definitions for Words in the Web 2.0 Category', 'Meta Collab', 'Tim O'Reilly - What is Web 2.0', and 'What is Web 2.0? Ideas, technologies and implications for education (Paul Anderson)'. The page also features a search bar, a 'Save a new bookmark' button, and a 'Tags' section with related tags and options.

Figure 7. Learning management system.

### Blogging and micro-blogging:

Blogging and micro-blogging services allow students to collaborate easily over the web, engage students in content generation.

The screenshot shows a WordPress blog interface. At the top, the site name 'ductranhuy' is displayed with the tagline 'Just another WordPress weblog'. A search bar is located in the top right corner. Below the header, a navigation menu includes 'Home', 'Introduction to Social software and Web 2.0', and 'Personal'. The main content area features two blog posts. The first post, 'Find my way in WordPress', is dated February 3, 2010, by 'admin' and has 1 comment. The second post, 'Reflect on personal blog setup assignment', is dated January 31, 2010, by 'admin' and has no comments. A right-hand sidebar contains an RSS feed icon, 'Recent Posts' (listing 'Find my way in WordPress', 'Reflect on personal blog setup assignment', and 'Hello world!'), 'Browse by Tags' (listing 'CMS Messing around WordPress'), 'Blogroll', and 'Archives' (with a 'Select Month' dropdown menu).

**Personal blog as part of the programme for collaboration**

The screenshot shows a Twitter feed titled 'Course tweeps'. The header includes the text 'Everything we do in the course' and 'The social software tweeps'. The feed contains three tweets:
 

- A tweet from 'ismailmechbal' with a link to 'http://mashable.com/2010...' posted 43 minutes ago.
- A tweet from 'edgardgeorge' reporting a 5 km run on 22/9/2010 at 11:45 AM, with a link to 'http://go.nike.com/66ri7...' posted 2 days ago.
- A tweet from 'isaacgriberg' mentioning a '#tedx #tedxchange' event in Geneva about '#mdg5', with a link to 'http://bit.ly/9Le9DJ' posted 3 days ago.

 The bottom of the feed features the Twitter logo and the text 'Join the conversation'.

Twitter micro-blogs where students can quickly notify others.

## Multimedia sharing:

### 4 Media on the web

The development of the read/write web (Web 2.0) has made it possible to create and edit multimedia content on the web. You will have the opportunity to work with media on the web in this assignment.

 [Media on the web](#)

 [Media on the web - resources](#)

The development of Web 2.0 has made it possible to create and edit multimedia content on the web thus allowing opportunities for a multimodal approach for more effective learning

## Social networking:

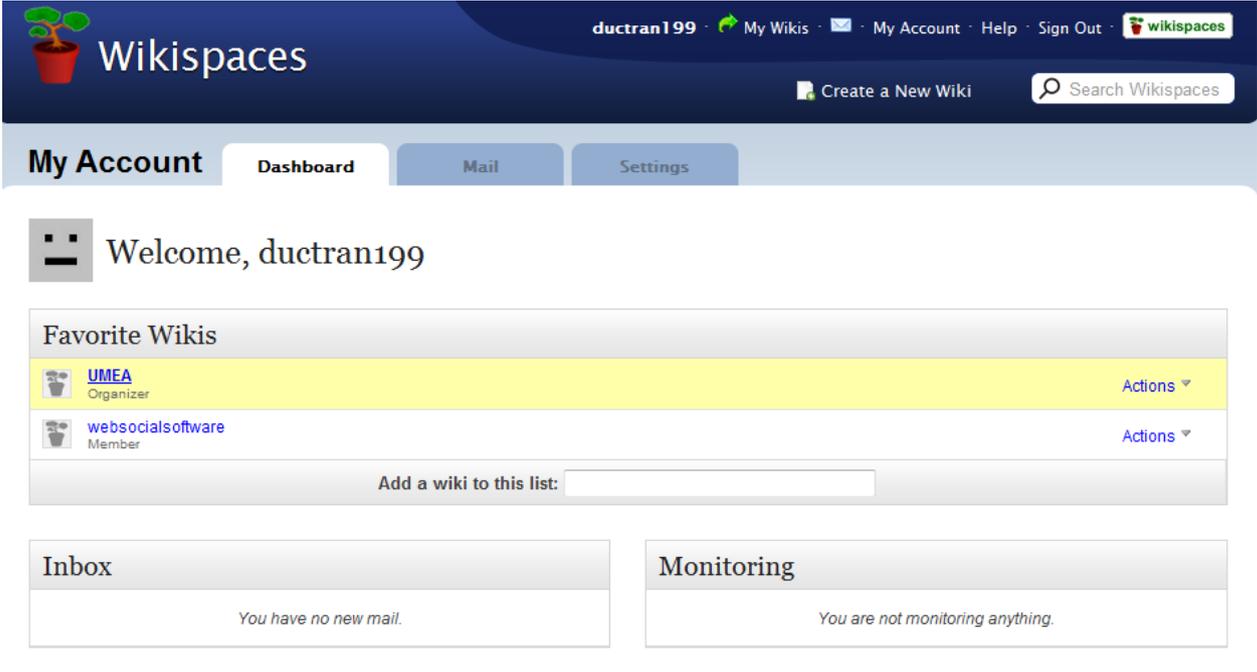
Students were given a task is to join a social networking site and analyze online social networking as a general phenomenon, and also conduct a more in-depth study of one specific social network.

## Wiki:

A group of students will form a group and mutually entered into a wiki which would support

- Multiple users, (please setup a user account teacher/teacher with admin rights)
- Discussions
- Version history
- Free to use

Students were able to discuss over a particular topic and saw how the wiki evolve; the ease of organizing contents within wiki made it a useful tool for collaboration and content management.



The screenshot shows the Wikispaces user interface. At the top, there is a dark blue header with the Wikispaces logo on the left and navigation links for 'ductran199', 'My Wikis', 'My Account', 'Help', and 'Sign Out' on the right. Below the header is a light blue navigation bar with 'My Account' selected, and sub-links for 'Dashboard', 'Mail', and 'Settings'. A search bar is also present. The main content area starts with a 'Welcome, ductran199' message. Below this is a 'Favorite Wikis' section listing 'UMEA' (Organizer) and 'websocialsoftware' (Member), each with an 'Actions' dropdown. There is an input field to 'Add a wiki to this list'. At the bottom, there are two boxes: 'Inbox' with the message 'You have no new mail.' and 'Monitoring' with the message 'You are not monitoring anything.'

The screenshot shows a web interface for 'webo-socialsoftware'. At the top, there are navigation tabs: 'home', 'PAGE', 'DISCUSSION (3)', 'HISTORY', and 'NOTIFY ME'. On the left sidebar, there are links for 'New Page', 'Recent Changes', 'Manage Wiki', and a search box. Below these are categories like 'Home', 'Aggregators', 'Media', 'Social networks', and 'Web applications'. The main content area displays a discussion thread titled 'Your thought's about the Wiki?'. The first post is by TobiasBoman (Apr 13, 2010 5:37 pm) asking for thoughts on categorization. The second post is by StefanSj (Apr 15, 2010 2:31 pm) suggesting lastFM as media and deviantART as a social network. The third post is by TobiasBoman (Apr 28, 2010 10:58 pm) asking about generalizing categories.

Similar combination of these web technologies could be found elsewhere such as the project carried out by Yang and Sinnappan (2009) “Emerging Web technologies in Higher Education” or the Swedish distance-based teacher training program studied by Olofsson and Lindberg (2006).

The table below shows where emerging web services have been intentionally used and in what way to reduce distance learning based on Moore’s transactional theory model:

Moore dimension	Activity	Outcome	
Dialogue	<i>Learner-content</i>	All web 2.0 technologies were heavily employed including wikis, blogs, podcasts, vodcasts, tagging, RSS etc.	Overall, my group consisting of 3 members had a positive feeling about web 2.0. We had to learn Web 2.0 technologies so it would be better to actually interact with them instead of reading about them.
	<i>Learner-learner</i>	As we are pretty tech savvy, we deliberately employed different software and tools outside of teachers’ recommendation	Learner-learner interaction has been so much richer and easier. Skype allows for long-distance call at a very low cost compared to long distance telephone lines because we live in different countries. Social networking tool like facebook means students can networking and build a virtual community of the cohorts. Email, blogs or microblogs allows instant exchange of writing content. We can tweet to send a short message to all followers. We found group mates this way. We tend to chat on skype and email or wikis to collaborate. Even though I learned great deals from my friends and we collaborated well, we did not have the personal touch like working onsite together.
	<i>Teacher-learner</i>	There is one teacher and one instructor working with us. The	We mainly work with the instructors. Communications have been clearly better with the use of asynchronous as well as synchronous

		teacher set out course structure and evaluation. The instructor maintained	<p>communication tools. We emailed to clarify matters, the instructors commented on our works by directly editing our wikis or commenting on our blog exchanges. He tweeted us to inform us of the assignment deadlines.</p> <p>Clearly distance communication has been improved with technologies but can't be compared to one-to-one conversation.</p> <p>The learning platform also used RSS or tweets to notify us of relevant events happening such as new posts in the wiki, deadlines approaching or assignments published. Overall, this is an interesting feature to stay informed of things happening given that we are all far away and distracted by other commitments</p>
Structure	Flexibility in curriculum and reading assignment	Students contribute to the reading list	<p>Teacher published the reading list via social bookmarking tool delicious at <a href="http://www.delicious.com/vinn/6IT000+vt091">http://www.delicious.com/vinn/6IT000+vt091</a></p> <p>We were encouraged to add to the list of the suggested reading materials based on the broad curriculum and learning objectives. We will social tags or keyword to denote the key points of the materials that we found on the net.</p> <p>We also used RSS to automatically "pull" articles from publication sources with relevant "tags". We can read headlines and judge whether we should delve further into a topic or simply stay informed of events happening relevant to our interest.</p>
		Students choose their own topics based on their own reading list	We also have a reflection session to find an industry or a topic that Web 2.0 has been particularly relevantly applicable. Students could choose any topics that they find relevant and add to the general knowledge repository.
	Flexibility in evaluation process	Peer review and feedback on the evaluation activities	<p>We are free to choose our social software and tools based on the suggestion teachers. We chose to use wikispaces to discuss and publish our project works while others went to Wikipedia. Wikis allow us to exercise peer evaluation.</p> <p>The strongly encouraged reflection process allows us to comment on the evaluation activity assigned to us. However, this is fairly broadly organized so we can only generally reflect on our experience without much proper guidance</p>

Learner autonomy		Allow users to exercise autonomy in evaluation process.	We were given a task to write about a short paper about Web 2.0 communication. We chose our own topic with our own reading and structures based on our own background. The end result was positive
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Overall, the learning has been positive, thanks to Web 2.0 the collaboration among teachers-students and students-students have been more interactive. I can't imagine if we can put together the amount of work with only telephone line and postal mails. The costs alone would bar me from completing the course. The long waiting time for mails to be posted to different countries means that the pace is much slow down. Depending on the nature of the conversations, we can choose to use facebook to quickly notify, email for long mails, skype for video and voice call etc. The overlapping functions of these social software mean we can mix and match them to our benefits. Instructors have also been quite active on the emails and tweets channels. But they have not active on synchronous channel such as Skype. The overall experience has been positively influenced by Web 2.0 but we still feel that face-to-face conversation will be superior, the communication and psychological gap of misunderstanding by Moore has been reduced but certainly there.

We exercised certain flexibility in the course from expanding reading lists to choosing our own technologies that fit into the broad curriculum required to getting to know and evaluate the impact of Web 2.0 on our collaboration process. Wikis have been particularly useful to present our combined knowledge. Version controls and users profile allow us to view individual contribution. Sharing and feedback can also be done via blogs where we posted exchanges in a chronological order. A large element of evaluation is a reflection paper work where we chose a topic that Web 2.0 has been helped to improve the collaboration process. The topic is of our choice and we had the freedom to work in a group. We exercised our autonomy to take advantages of the flexible structure to write a short paper about Web 2.0 communication. The background of myself in explaining clearly technologies and my colleague in communication models have gelled well and we had a good group project.

## 8 ANALYSIS

The sole purpose of my thesis is to make distance education better.

Distance education first started out similar to what we call community learning centers or night classes nowadays and distance higher education providing education at University level degrees and courses started out in 1950s.

Theory of pedagogy pointed to two opposite theories: objectivism and on the spectrum: constructivism. While it is easy to charter two theories as diametrically opposite of each other, the view I would take is there are overlapping and complementary to each other; there are certain elements of objectivists to constructivism as vice versa.

While constructivism is acclaimed to be more effective learning theory, its strong criticism is the difficulty to apply it to real world curriculum. Moore's theory provides just that. It is a concrete idea as to how to apply theory into practice and a framework to benchmark distance education, to evaluate distance education. Moore pointed out 3 key areas to make-up of distance education: dialogue, structure and learner autonomy. Moore argues that having enough constructive dialogue, flexible structure catering individualism and a high level of learner autonomy to execute learning; we can reduce "distance" in distance education. Moore is equally concerned about pedagogy as he is about technologies and have incorporated into his theory how technologies changes have influenced the way distance education has been for the better. This is the brilliance of Moore, he has not sided with either pedagogy or technology, he observed the rise of technology and the influence it has on distance education but refused to see technology as the sole factor that makes distance learning more effective or reduce "distance" in distance education.

The linkage between constructivism and Moore's theory is of significance although it is only barely acknowledged in Moore's writing. The magnitude of this connection is that first it highlights the work that Moore has done has been based on strong theoretical pedagogy, his contribution is that he simplify a grand ideology into something that can be applied into class room.

Moore's theory pointed out three variables that make up the function transactional distance and some relationship among themselves. Moore defined transactional distance as "a psychological and communications gap, a space of potential misunderstanding between the inputs of instructor and those of the learner" which is really vague in its boundary as well as how to measure such "gap" or "space". "Dialogue", "structure" and "learner autonomy" while defined as independent but some of his writing pointed to the opposite. Six instruction process of structure contain dialogue. Presentation process for example contains the triangular relationship of instructor-content-learners dialogues. "Support of the learners' motivation" "stimulate analysis and criticism" and "give advice and counsel" are pretty much about dialogue and little structure. It is however understandable that structure has to have dialogue and dialogue is part of structure. If dialogue is not part of an instruction process clearly it is not for education purpose violating condition "dialogue is directed towards the improved understanding of the students". In his paper "Three types of interaction" (1989) Moore pointed out 3 interaction that formed dialogue instructor-learners, learner-content, learners-learners but Moore also pointed out silent or internal interaction with a distant instructor or author. This could be understood learner-content interaction. When describing "dialogue", Moore took into account the role of teachers and learners' personality which in turn is a factor that made up "learner autonomy". And because structure also determines "dialogue", the set of three variables are actually linked together. While analyzing "structure" purely from the flexibility angle, Moore suddenly pointed to

“appropriately structured” and “well-structured” materials to reduce transactional distance (p27.) “Appropriate structure”, Moore argued must vary according to content, levels of instructions and learner autonomy. So structure has to be appropriate and measured by usefulness not by flexibility. Of course usefulness to some would be a structure less-flexible not more. A large proportion of Moore’s ideas he said could be found in constructivist movements. Influential Brazilian educator Freire (1972) emphasized mutual dialogue in fostering learning. Brookfield (1986) identified learner autonomy as a precondition for learning as well as freedom which resemble the open nature of dialogue, flexible curriculum as well as learner autonomy.

Moore had two distinctly important contributions to the field. Firstly, he was able to pioneer a model with variables and operational function. It should be noted that several empirical studies either confirm or falsify it. Secondly, his dual concentration on pedagogy and communication technologies has been particularly important to the study of distance education. His analysis of technologies did not explore the implosive significance of the Internet and world-wide-web. The thesis built on these two strength points, extending his analysis of value-added Web 2.0 and measuring the impact of technologies using his transactional distance model.

Web 2.0 has been touted as the technologies that could substantially reduce transactional distance. The architect of openness and participatory has created a collaborative community of teachers and learners. Together with the multi channels of synchronous and asynchronous communications and multimedia consisting of texts, pictures, videos and audios all integrated into a single platform has fostered dialogue. The rich technologies of course also as in the case of the projects experimented by Kane and Finchman (2009) to actively involved in instruction structure processes all the way from content presentation, peer review, feedback with instructors to evaluation as well as knowledge creation. Researchers tend to agree on the impact that web 2.0 could leverage but ultimately research has to come up with a reliable framework to harness such technologies to purposeful activities rather than ad hoc projects.

There is little doubt that the thesis and the works that I have reviewed is a tiny bit of the oceans of knowledge, the old debate of constructivism and objectivism many times take roots in principle debate of authority versus democracy, of the few versus the many, of qualified experts versus organized community efforts.

Moore’s theory is also not the only prominent one in the field of distance learning. Otto Peters (1983) theorized distance education as the most industrialized form of education and Holmberg (1983) coined guided didactic conversation theory.

Web 2.0 is a loose concept and has been treated so. I looked at Web 2.0 not as fixed technologies but as a broad ecosystem of technologies, technologists and users which constantly evolve and expand. And the future of Information Communication technologies including but not limited to Web 2.0 would certainly be more beneficial to distance learning.

## 9 CONCLUSION

In my thesis, I have discussed the role of distance-learning and have discussed how constructivism makes better education, Moore's analysis that distance education is naturally education and thus what makes education makes good distance education. Better education according to Moore is when you can reduce "transactional distance" by influencing its makeup dialogue, structure and learner autonomy. I also looked at examples of where Web 2.0 has been successfully applied to reduce "transactional distance" grounded in Moore's theory. I looked at the humble historical context of distance-learning and the spectacular achievements that distance-education teachers and students despite all those forces against change. I discussed the development of distance-education to become what it is today. I believe technologies are part of the solution but also we need strong pedagogy and a rigorous framework to guide it.

The discussion of constructivism vs. objectivism showed the contrasting differences as well as certain overlapping elements of both ideologies. I believe constructivism was the pedagogy of the 21<sup>st</sup> century which involves a great deal of personal reflection, interaction among course peers and teachers as well as a shift in how education must be organized. Moore's theory of transactional distance is grounded in constructivist pedagogy but has his fair share of genius thought. First, he convinced us that distance education is also education because the distance in distance education or what Moore called "transactional distance" also exists in face-to-face classroom education, to make better distance learning means to reduce "transactional distance". Second, his ability to benchmark an operational framework to organize distance education and measure transactional distance as a result or influencing the three variables dialogue, structure and learner autonomy. His work has been proved by Saba (1994) with dynamic systems modeling as well as questioned by few critics of his poor theory construction as well as unconvincing empirical data gathered from a few studies. However, Moore's theory of transactional distance is still the prominent theory and Moore himself a leading figure in the field.

Transactional theory is realized by a new wave of highly interactive web technologies built on the architecture of openness and participatory. This plays well into constructivism of build a virtual learning community for collaborative learning. We looked at a prime example of employing Web 2.0 technologies for better distance education by Kane and Fichman (2009). The benefits of instruction activities that otherwise would not be possible without Web 2.0 have been analyzed and evaluated using Moore's variables to yield a positive result. I also demonstrated a personal experience being part of a distance learning course at Umea University in Spring semester 2010 where we all learned about distance learning in the modern age and apply constructivism pedagogy and Moore's transaction theory distance in evaluating the course.

Understanding the theory makes me a better student because I know what makes effective learning and also further confirm my belief in the mandate of distance education, a distance education for all because you can't learn individually. Kane and Fichman (2009) have surprised me to the extent of their creative ideas of applying Web 2.0 in education such as the idea of crowdsourcing and peer review by wikis. Able to use technologies especially in a live environment such as the course at Umea University gave me a real sense of gaps between theory and practice.

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