CONSTRUCTING A CRITERIA FOR THE ASSESSMENT OF INTERACTIVITY IN LEARNING MANAGEMENT SYSTEMS

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Abstract:

Interactivity is considered indispensable in most, if not all e-learning learning management systems (LMS) according to Helen Geiger of Prometheus Training, LLC. It therefore follows that the level of interactivity in any LMS is vital to determining whether an LMS delivers its educational intentions or not but can interactivity be assessed at this point in time? To date, there is no instrument or paradigm that can be used to measure or assess the levels or quality of interactivity in an LMS package. Considering the infancy of new media, what currently exists are concepts of interactivity as pioneered by various proponents and other academic fields that view interactivity in different ways. This study attempts to synthesize known concepts and perspectives of interactivity using the qualitative approach to come up with a comprehensive criteria or paradigm for interactivity which may be used to assess learning management system packages, albeit subjectively at this point, but nevertheless, systematically. The synthesis of widely known and accepted concepts of interactivity will inevitably result to a systematic criteria or paradigm derived or extracted from all possible perceptions of interactivity and will therefore result to a system of assessment that may help to improve current learning management systems and possibly identify shortfalls or lacks in these systems. Consequently, with a more organized and systematic perspective of interactivity, creators of learning management systems as well as institutions using said management systems could customize their packages to allow a more effective and efficient learning experience for students utilizing the e-learning platform. Possibly and eventually, with the organization and systematization of the concepts of interactivity, other researchers and scholars would find a more viable springboard for theory building.

Introduction:

I completed my baccalaureate degree, Physical Therapy, via the conventional tertiary education delivery system. When I was in high school, I was contemplating on completing a course on tourism via a certain institution that offered what was then called 'correspondence education'. I sent an inquiry through snail mail and got a marketing packet from that institution, also, via snail mail, about a month after I sent my inquiry. That was when I felt correspondence schools could not work; imagine having to get my professor's comments to an essay I submitted two weeks ago; factor in the professor's work load and I would probably end up with forever before hearing from said professor, but that was before the internet was widely available. During my first few months working as a teacher for emergency and elderly care, I learned that the University of the Philippines, through its Open University offered masters degrees. I decided I would try it and applied. I got in, enjoyed the program immensely and graduated dean's list, Masters in the Professional Studies in Development Communication without seeing as much as a photo of my professors until my graduation. Had I not decided to attend the optional graduation ceremonies, I would probably not have seen my professors to this day. Let me also add, without being too condescending, that I probably learned more through the Open University than many other Masters aspirants taking up courses in almost all of our local colleges via the conventional educational delivery system. Amazing, some might say, I say innovative.

It was the Integrated Virtual Learning Environment (IVLE) back then and now it has morphed into something else sounding even more playful and inviting than IVLE. Now, it is called Moodle or the Modular Object-Oriented Dynamic Learning Environment. The acronym may sound playful, but each of the words in the acronym are more than just a mouthful, in fact, these are words that define most learning management systems (LMS) in use today – modular, object-oriented, dynamic. This considered, the question remains - what exactly does both the IVLE and Moodle along with other LMSs and VLEs have in common that make them effective learning delivery systems? Surely, the material delivered is course and university dependent and the way it has turned out for me during my MPS-DC days, I must say that I did learn useful and quality information, although I cannot speak for other universities offering the same kind of educational package. I often hear from marketing and sales pitches of online or open universities that on-line or distance education, as it is referred to today, is an innovative way of delivering educational information. While this is true, because most e-learning nowadays utilize information technology, I daresay that it is not really the delivery system that is the reason for the educational success stories of these educational delivery systems. It is something more than that, something many choose to refer to as *interactivity*. Unfortunately, this is where the trouble begins – while many want to invoke interactivity in the way it is invoked in almost all learning management systems, we actually do not have a definite grasp of the concept just yet. What exactly is interactivity and why is it so important to e-learning, or is it even (important), at all?

Constructing A Paradigm For Interactivity In Learning Management Systems:

The concept of interactivity, while not really under fire, has managed to still remain in a grey area to this day. Various fields have a distinct usage of the concept so that "it seems relatively unclear just what 'interactivity' and 'interactive media' mean" (Jensen, 2011:185). If

this is to be true, the concept of interactivity has yet to be firmly established. On the outset, it would seem that nobody is arguing against anybody when it comes to interactivity because of the relatively enigmatic nature of the concept. With this being a good thing, researchers and scholars alike are left to explore interactivity with more freedom until a narrower perspective of the concept of interactivity is reached.

Nevertheless, the exploration of the concept of interactivity has been very dynamic in the past years particularly because of information technology, which, from my perspective, is fertile ground for such a concept as interactivity as information technology seeks to bring to the masses information and services that used to be excruciatingly inaccessible. Interactivity, supposedly promises to make "a huge amount of information available to anyone at the touch of a button, everything from airline schedules to esoteric scientific journals to video versions of off-off-off Broadway…Consumers will send as well as receive all kinds of data…Viewers could select whatever they wanted just by pushing a button" (Newsweek, 1993:38 as quoted by Jensen, 2011:185). Based on this promise of interactivity, it can therefore, be assumed that said concept is the ability or the capacity to direct an information source to deliver the information that a user needs or wants or to direct the object of interaction to respond to the user and perform as directed by the user. Here one has the basic utopian definition of interactivity, a slave. If this definition is to be taken into consideration, one finds that interactivity has three elements the commander, the command, and the unequivocal, rapid, and accurate or exact response. Taking this into the context of learning management systems, interactivity is hence, the ability or the capacity of said system to allow the user to issue a command and get a response (embellished with all the qualities of an interactive response, that is) as quickly as possible.

There are other concepts of interactivity worth considering in the context of learning management systems like, "it extends – perhaps not surprisingly – from the concept of 'interaction'. A concept which generally means: 'exchange', 'interplay', 'mutual influence'" (Michael Jäckel,1995 as quoted by Jensen, 2000:188). Here, one sees the words exchange, interplay, and mutual influence. In essence, interactivity in this respect can be viewed *as a form of communication albeit, more enhanced*. The problem with viewing interactivity in the context of interaction is that various other fields define interaction in different ways, for instance, "Lee and Gibson (2003) briefly define the interaction as "reciprocal communication among the participants" (in Karatas, 2008:1), there there is Song (2003) who defines "interaction as occuring between two or more people in order to explain point of views and conflicting points" (in Karatas, 2008:1). Of note, among these varied definitions is that of Garrison (1993) who "defines web interaction as "bilateral interaction of two or more people in a learning context" (in Karatas, 2008:1)

There seems to be a considerably accurate idea of what interactivity represents despite varied perspectives. From the above definitions of interaction, one stands out in the context of learning management systems and that is Garrison's (1993) definition that views "web interaction as bilateral interaction of two or more people in a learning context" (in Karatas, 2008:1). Therefore, if the meaning of interactivity is to be explicated from this definition of interaction one finds that in learning management systems interactivity is present if said system is web or internet based, an interaction between two or more people occurs, and when said system seeks to achieve learning. Here, one finds that one other element as mentioned earlier is lacking, and that element is the duration at which interaction occurs. However, it might be acceptable to leave this element out on the assumption that when interaction occurs through the

web or the internet, the speed at which such interaction takes place is already assumed to be rapid; and when such an assumption is made, the assumption of accuracy follows as well.

Unfortunately, interaction, in this respect, is only viewed from the perspective of one proponent and the problem with interaction viewed in this perspective is that it limits interaction to active participants or people. Terry Mayes (2006:9) in the book "Interactions in Online Education" offers another perspective of interaction in online learning and such occurs with concepts and tasks apart from that occurring between people. In this perspective interaction can occur passively when a learner interacts with concepts thus "interact(s) with information, or the representations of subject matter, or, in educational computing shorthand, with 'content'" (Mayes, 2006:10); learners interact with tasks when they "carry out the tasks set and their performance renders visible to the agent providing feedback (this need not be a person) some aspect of the learners' state of understanding" (Mayes, 2006:14). This perspective of interaction, as opposed to the earlier perspective by Garrison offers two other elements previously absent; these are interaction with concepts and tasks. Here, interactivity gains two more learning dimensions these being that it should be able to modify the learner and the external world of information (task interactivity) and that it should be able to modify an "existing concept, so that both agents in the interaction (the new information and the learner's existing knowledge structure) are subject to some effect from the act of comprehension (concept interactivity)" (Mayes, 2006:23). Mayes (2006:24), like Garrison, does acknowledge interaction with persons in her concept of interactivity and in this paradigm she identifies social and educational dialogue as the consequence. If both concepts of interaction are taken into account, interactivity in learning systems thus requires a learning management system to do two things to be considered interactive; first, it should allow exchanges between people, tasks and concepts and second, it should, from these exchanges, initiate, or facilitate dialogue, modify an existing concept through comprehension of new information affecting the learner's existing knowledge structure, and illicit changes within the learner and the external world of information. In addition, the level of interactivity of a learner should, in theory, enable the system to respond appropriately. The combination of the two perspectives of interactivity in e-learning tackled here can be illustrated in three paradigms as follows:

Figure 1 The Learner-Person Interactivity Paradigm

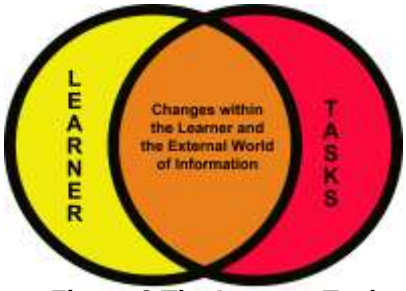

Figure 2 The Learner-Task Interactivity Paradigm

Figure 3 The Learner-Concept Interactivity Paradigm

In Figure 1 we see the interactivity concepts put forward by both Garrison and Mayes and in Figures 2 and 3, the concepts put forward by Mayes. The challenge now is how to put these paradigms in the context of learning management systems so that in addition to the interaction between the learner, persons, concepts and tasks, we also illustrate the relationship of these interactions to the system. Assuming, for instance, that in the Learner-Person Interactivity

Paradigm, social or educational dialogue comes as a result; the learning management system, therefore, in response to this, should provide a venue for such a dialogue via the interaction of said paradigm with the learning management system. In most cases, and based on experience, most learning management systems embody this appropriate response in what is called forums and chat rooms. For both the Learner-Task and Learner-Concept paradigm, the appropriate response of the learning management system is mediated by the tutors/instructors/professors in the form of evaluation and assessment strategies. Surprisingly, the appropriate response of the learning management system for the second and third paradigms boomerang back to the first paradigm so that changes or modifications within the learner, his/her knowledge structure, and the external world filter through in the social and educational dialogue that occurs in the Learner-Person paradigm. Insights that could be gained from this is the value of learner-person interactivity to interactivity in general and that possibly, what emerges in dialogue resulting from the Learner-Person paradigm that are, in full or in part, connected to the consequences of the other two paradigms, are surplus ideas that are expressed because of the absence or inadequacy of a venue for the latter two paradigms. On the outset, many will argue that all three interactivity paradigms should function hand in hand in a learning management systems, hence, the interactivity that exists in the latter two paradigms should not be judged according to the spill-over in the first paradigm. If this is considered, a certain degree of communication should exist between the three paradigms hence,

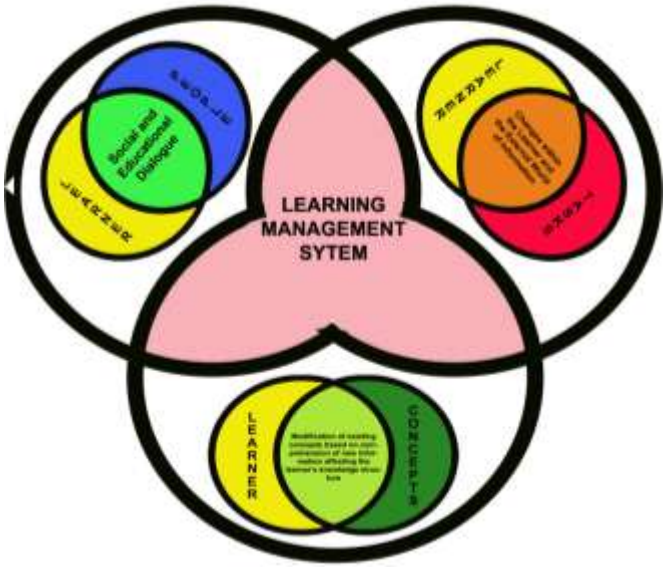

Figure 4 Theoretical Model for a Fully Interactive Ideal Learning Management System

In effect, from the above theoretical paradigm of a fully interactive learning management system we go back to the early definition of distance education, this being correspondence schools done via snail mail and not the internet. If the above paradigm is to be regarded, one very simple truth emerges; that regardless of the method of delivery (snail mail or the internet) interactivity is in fact possible and present. However, with traditional correspondence schools interactivity may have occurred at a lower rate compared to information technology aided e-learning. With the above paradigms it thus becomes possible to extract a criteria that would enable future researchers, educators, or scholars to determine whether interactivity is ample in a particular learning management system.

Building A Criteria For The Assessment Of Interactivity: Theoretical Foundations:

Holding on to the above paradigm of an interactive learning management system, we now explore what other proponents have to say about interactivity and its assessment. Jensen (2011), who, while identifying three possible ways of defining interactivity (as a prototype, as a criteria, and as a continuum) submits to the position that interactivity can best be defined as a continuum where it can be present in various levels (192) thus recognizing that interactivity can be assessed whether it is the assessment of its rate, frequency, or level. In another study conducted by Melissa J. Dark, Cindy S. York, Voicu Popescu, and Cristina Nita-Rotaru (2007) titled "Evaluating Interactivity and Presence in an Online Distance Learning System" interactivity was merely one of the drivers to determine the efficiency of a computer-mediated e-learning system but interactivity itself was not measured. Instead, Dark, et.al. (2007) focused on how effective the system was in delivering an educational program based on presence and interactivity – surprisingly enough, the study sought to consider interactivity despite the enigmatic nature of the concept. This particular study demonstrates the importance of interactivity to an e-learning system and the need to dissect the concept to the extent of being able to explicate a criteria from its dissection with the end objective of being able to assess an e-learning system on the basis of interactivity alone. The importance of evaluation and assessment strategies as a criteria for evaluating interactivity in e-learning sytems as described by Philip Butcher (2008) in his study "Online Assessment at the Open University Using Open Source Software: Moodle, OpenMark and More" which stresses the need to assess the impact of content and tasks to determine learning management system efficiency is (in particular in Figures 2 and 3), an illustration of the assertion that the results of the paradigms in Figures 2 & 3 require a venue for expression of said results. There are more studies on e-learning and learning management systems that support the position that interactivity is in fact of paramount importance to said systems that it deserves no less than empirical, or even, at least, at this point, contextual or conceptual interactivity assessment and evaluation. Nevertheless, no tool or instrument or criteria yet exists to effectively perform interactivity evaluation.

This researcher posits that by focusing on the ideal results or consequences of the three paradigms of interactivity, one can clearly identify what needs to be 'found' in an e-learning management system to determine whether such a system has ample interactivity to facilitate effective learning.

Perhaps, many of us are familiar with the different dimensions of interactivity as proposed by various authors. In taking the key elements of these dimensions and cross referencing them with the three paradigms of interactivity as offered in this study, it becomes particularly clear that the three paradigms are able to accommodate the key elements of these dimensions; or taken the other way around, the key elements of the various dimensions, somehow, intersect with the basic premise of each of the paradigms. Below is a matrix representing this assertion:

	Learner-Person:Educational And Social Dialogue	**Learner-Task:Changes Within The Learner And External World Of**	**Learner-Concept Paradigm:Modification Of Existing Concepts Based On Comprehension Of New**

		Information	Information Affecting The Learner's Knowledge Structure
One Dimensional Model of Interactivity (Everett Rogers, 1986)	Interactivity is the capability of new communication systems (usually containing a computer as one component) to 'talk back' to the user, almost like an individual participating in a conversation"		
Two Dimensional Model of Interactivity (Bohdan O. Szuprowicz, 1995) **"Interactivity is best defined by the type of multimedia information flows"**	User to user interactivity	User to computer interactivity	User to document interactivity
Three Dimensional Model of Interactivity (Brenda Laurel, 1990) ***"Interactivity exists on a continuum that could be characterized by three variables" specifically:***	Frequency, in other words, how often you could interact"		"Significance, or how much the choices really affected matters" "Range, or how many choices were available"
Four Dimensional Model of Interactivity (Lutz Goertz, 1995 in Jensen, 2011) ***Isolates four dimensions, which are said to be meaningful for 'interactivity':***		"The degree of choices available"	"The degree of modifiability", The quantitative number of the selections and modifications available" The degree of linearity or Non-linearity"
N-Dimensional Model of Interactivity (Carrie Heeter, 1989) ***Understands interactivity in relation to communication technologies as a multidimensional concept***	"The degree to which users can add information to the system that a mass, undifferentiated audience can access" "The degree to which a media system facilitates interpersonal communication between specific users"	"The amount of effort users must exert to access information" "The degree to which a medium can react responsively to a user" "The potential to monitor system use" (: 224), understood as a form of feedback that automatically and continuously registers all user behavior while on the media system"	"Selectivity concerns the extent to which users are provided with a choice of available information"

Table 1 Interactivity paradigms and interactivity key dimensional elements interaction matrix.

Just by looking at the matrix one very obvious conclusion emerges; that the intersections of key elements of the various dimensions of interactivity with the three paradigms are distributed evenly. What one dimension may lack in relation to the three paradigms is made up for by the other dimensional key elements. In other words, the key elements of each of the dimensional perspectives of interactivity provide sub-criteria for the determination of the ideal results for each of the three paradigms. Without complicating matters further, the criteria for interactivity exists where the paradigms intersect with the key dimensional elements of interactivity. Hence, for instance, to determine Learner-Person interactivity, the evaluator needs to look for the ability of the communication systems to talk back (One dimensional interactivity), enable interaction from one user to another (Two-dimensional interactivity), frequent interaction (Three-dimensional interactivity), accessibility of the user information to a mass audience (N-dimensional interactivity), and ability of the system to facilitate interpersonal communication between users (N-dimensional interactivity). Satisfaction of all these elements, or perhaps, the degree at which these elements are satisfied then determines the amount of social or educational dialogue that had occurred in the context of the Learner-Person Interactivity paradigm. The same is true for the other two interactivity paradigms where the intersections with the dimensional models of interactivity could be considered the sub-criteria for determining presence of Learner-Task or Learner-Concept interactivity.

Perhaps this might be a very simplistic way of viewing interactivity for now because apparently, the criteria was served on a silver platter, but currently, this is merely what is available. Leaving what has been discussed as it is for the moment; the more important aspect of this exploration is that we are not left with a dead end or a blind spot in understanding interactivity. Here we are immediately able to view interactivity in a more comprehensive manner and determine whether interactivity exists once the paradigms or the matrix is superimposed with the features of a learning management system. On the outset, determining the level of interactivity in a learning management system is not as simple as ticking off each of the elements in the criteria constructed. To make the criteria more effective and accurate instead of contextual and somewhat subjective, each of the criterion could be broken down into more specific elements and numerical scores could be assigned to each sub-sub criterion. However, for want of more space, that leg of this study is put off for future studies.

Future Directions:

Anybody can invent a criteria for the assessment of interactivity but perhaps the more important contribution of this study is not the invention of such criteria but the act of putting interactivity into a clearer perspective. As mentioned in the preceding paragraph, the criteria is still in its infancy and needs to be tested, re-visited, re-evaluated itself, and possibly, even junked. Nevertheless, one sees here the beginning of a quest – the quest for an empirical strategy able to assess interactivity in a learning management system stripped of any human error or subjectivity. Admittedly, the criteria created here is subject to loads of human error and subjectivity, but it is not what it is that makes it significant but what it is not. The criteria presented here is not gospel truth and so researchers could come up with a better criteria or possibly even seek to develop a formula based on what has been discussed here to determine empirical interactivity or to concretize this enigmatic concept once and for all. For what it is worth, this criteria has somewhat concretized interactivity to a certain extent and made it more tangible which is why it can serve as a basis for more tangible approaches to the assessment of interactivity. This criteria is the crossroads of interactivity so that it allows researchers to

determine which direction to take in interactivity assessment. It is the hope of this researcher that said criteria will open the floodgates of more academic inquests into the enigma of interactivity and initiate the restructuring of learning management systems in the interest of making these systems wellsprings of e-learning and distance education.

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