Considerations of Design and Development Aspects of Collaborative Technologies to Facilitate Ideas on Open Learning

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ABSTRACT

Interests on access to open learning, some tangential while others significant, have surfaced as the shared agenda of much debate in the educational community. This emergence of current technologies possesses unimaginable potential to penetrate barriers of physical and social contexts. Unexploited use of collaborative technologies evidently escalates these barriers and places us as individuals, and yet as members of society, in the far end of a constant developing teaching and learning continuum. Thus, it becomes crucial to identify available collaborative technologies to support open learning endeavors, and subsequently to identify how the uses of these collaborative technologies are able to navigate the borders of open learning. This paper brings into discussion a rhetorical perspective on the marriage of collaborative technologies and pedagogical parameters to facilitate ideas on open learning. Attention is thus drawn towards the design and development aspects of the interactive e-learning community (*i*ELC) discussion platform. The *i*ELC was developed using open source Moodle software that caters appropriately for both students and teachers in K-12 education. Conclusively, comprehensive studies on collaborative technologies are a need to justify provisions on open learning.

KEYWORDS: Open and Distance Learning (ODL), Online Learning, Online Community, Collaborative Learning, open source Moodle,

INTRODUCTION

Back in 1994 before the first online class was offered, taped lectures were the preference for video and TV classes (Daniel, 1997). Since then, online technology has progressed to a significant point that it possesses enormous potential to cultivate students' thinking practices in addition to effective delivery of content matter (Anderton, 2006). Curtis and Lawson (2001) claim that interaction and access of these quality resources in online learning environments are no longer a major setback. It is within this backdrop of progress in online technology that educators and trainers have taken interest in open and distance learning (ODL) (Daniel, 2002). However, it is only recently did ODL emerge as an "accepted and indispensable part of the mainstream of educational systems in both developed and developing countries, with particular emphasis for the latter" (Daniel, 2002, p. 3). The global initiative on development and sharing of ODL knowledge, resources and technologies is governed by the Commonwealth of Learning (COL) (Spaven, 2006). In parallel interest with COL implemented programs in ODL policies (Spaven, 2006), this article draws attention to pedagogical-technology integrated framework exercised on the *i*ELC discussion platform in Malaysian secondary schools. The *i*ELC discussion platform was tailored to the needs of the study using open source Moodle software. Since costs on running technology-mediated ODL is anything but marginal, exploitation of open source would prove to be an important contribution to COL in directing use of open source in ODL in developing countries (Spaven, 2006). Participation in the *i*ELC discussion platform involves a network of students and teachers working mutually in the exchange of knowledge. Interaction between students and their peers presents a positive outcome to their learning process (Moore, 1993) such as discovery of knowledge, reflection, critical thinking (Vighnarajah, Wong & Kamariah Abu Bakar, 2006b) and

higher order learning (Harasim, 1989). Curtis and Lawson (2001) suggest collaborative learning as means of improving interaction among students, quality of students' learning experiences and delivery of subject content. Hence, discussion on the pedagogy-technology integrated framework of the *i*ELC discussion platform is addressed with interest in advancing better practice of collaborative learning among student users.

COLLABORATIVE LEARNING AS CATALYST TO ODL

Harasim (1989) establishes that collaborative learning at its fundamental is a structured process of knowledge construction. Learning instigated through collaborative tasks is able to provide for improved task-engagement and communication among peers (Cavalier, Klein & Cavalier, 1995). Gutwin, Stark and Greenberg (1995) provide examples of collaborative tasks that students may engage in; for instance, peer learning/ teaching, discrimination of ideas and discussion, and fashioning practices of more experienced peers.

Knowledge is a social construct that requires the support of social interaction through means of peer interaction (Bruffee, 1984). Encouraging social interaction among students is an important factor in the learning process and in the learning outcome (Eastmond & Ziegahn, 1995). Harasim (1990) suggests peer learning as an example of effective collaborative learning strategy because it leads to sharing of information. Peer learning is beneficial to both peers seeking for instructional assistance and the one providing instructional assistance (Hiltz, 1997). When the more knowledgeable peer is providing instructional assistance to the seeker, the provider also benefits from articulation of knowledge and integration of several chunks of knowledge In a recent study by Curtis and Lawson (2001), findings point out that analysis on students' participation in online discussions provides evidence of strong collaboration among peers in the online learning environment. The Namibian College of Open Learning (NAMCOL) project is clearly one of the success stories of COL. Engaged in open and distance learning NAMCOL is currently the leading educational institution in Namibia in terms of full-time equivalent learners (http://www.namcol.com.na). Although initiatives on the NAMCOL project was aimed in providing educational access to Namibians and South African learners the outcome of the e-learning project has made an enormous insight making way for a better understanding of learners in an online learning environment. Learners engaged in online learning environments come with diversities in background, economics, socio-cultural, ability, understanding of subject content, technology-savvy, views on learning approaches and so forth. Effective practice of collaborative technologies is able to navigate the borders of physical and social contexts complementing these diversities of learners. In other instances diversity is also perceived as a catalyst for creativity (Florida, 2005). Given that learning can occur across the depth and breadth of physical and social contexts along with an inexhaustible number of learners it is paramount that the educational community researches on collaborative technologies in attempt to tackle these diversities that learners project in online learning environments. Johnson and Johnson (1989) assert that abundant of research in secondary education suggests that learners who engage in collaborative learning are able to significantly achieve higher-level reasoning and motivation and retention of subject content.

THE *i*ELC DISCUSSION PLATFORM

The *i*ELC discussion platform was developed specifically for this study in attempt to advance better practice of collaborative learning among the student users. The *i*ELC discussion platform developed using open source Moodle can be regarded as an example of collaborative technology because it addresses the qualities of collaborative technologies mentioned in the preceding discussion. The *i*ELC discussion platform necessitates participation of students and teachers from Malaysian regular national secondary schools in mutual communication and goal in improving the teaching and learning process (Vighnarajah et al., 2006a). Findings of another study by Vighnarajah et al. (2007) also indicated that participation in the *i*ELC discussion platform

is able to encourage student users to be independently engage in the learning process beyond parameters of classroom and curriculum. This is imperative particularly in the exam-oriented-dominated Malaysian educational system (Smart School Bulletin, 2003). In view of online collaborative learning, Moisseeva, Steinbeck and Seufert (2007) emphasizes that reciprocated learning among learners via the Internet strongly promotes foundation of online learning communities. Moreover, online community shares construction of knowledge, motivation and strong communication among peers which warrants a high quality of online collaborative learning environments (Moisseeva et al., 2007). Among other benefits of engaging in online learning communities are better understanding of subject content, improved communication skills, emotional and learning support and learning through practice (Moisseeva et al., 2007).

This paper is concerned with exploiting the use of collaborative technologies as means of navigating the borders of ODL. The discussion takes up a broader definition of collaborative technologies than a conventional understanding. This is imperative to the discussion given the recent progress of the Internet such as Broadband and escalating understanding and need to implement collaboration through use of online technologies. However, it is imperative that selection of the collaborative technology caters to the needs of a study, learner or/ and faculty. Commercial learning management systems (LMSs) certainly forward some financial issues. This suggests some serious considerations when the LMS needs to accommodate a large number of students with a minimum budget possible. Examples of commercial LMSs include Apex Learning, Blackboard Inc. and Angel Learning. In other words, use of open source software would be the better alternative when funding raises some concerns. Examples of open source software include Claroline, Dokeos and Moodle. Spaven (2006) points out although COL's advocacy of research on open source is still rather recent COL emphasizes the importance of raising awareness on the benefits of open source.

The Moodle software was chosen for this study after a brief comparison study on the feasibility of both students and teachers in using the instructional tools and activities provided in Moodle. This measure is necessary to ascertain regulation of pedagogical and technological concerns with aim to elevate optimal students' participation and minimal teacher-centered teaching. Collis, Andernach and van Diepen (1996) also emphasize that effective and unbiased integration and pedagogical and technical support allows for effective collaboration. Moodle is used to create Internet-based courses and websites. In addition, Moodle offers effective pedagogical and technical support (http://moodle.com/). Brandl (2005, p. 16) points out that Moodle addresses a collaborative learning environment stating that "furthermore, it [Moodle] purports to create an environment that allows for collaborative interaction among students as a standalone or in addition to conventional classroom instruction."

DESIGN AND DEVELOPMENT ASPECTS OF THE iELC DISCUSSION PLATFORM

The following accentuates on use of the ADDIE model as the framework for managing the iELC discussion platform. The model comprises five key phases which are analysis, design, development, implementation and evaluation. Again, the initial intent of this paper is to provide some fundamental guidelines for development of similar online discussion platforms with emphasis on providing collaborative learning support. These guidelines were improved from an anthology of pedagogy-technology scrutiny. Hence, these guidelines are able to accommodate needs of similar studies that attempts to advance learning skills such as self-regulated learning, motivation, self-efficacy and the likes of it. Although the paper only addresses discussion on the design and development phases it is necessary to recognize the description of these phases. In this study, the analysis phase looked into identifying the current problem scenario that needs to be tackled. The phase consists of several consequential, relevant measures, beginning with review of literatures on the learning skills to be conveyed in the study. This allows for disclosure of alternatives in advancing better practice of the intended learning skills. Subsequently, needs analysis must be conducted to identify the best available means of implementing these suggested alternatives. Figure 1 below provides a graphical representation of the steps involved in the

analysis phase during the development of the *i*ELC discussion platform. In this study, the learning process consisted of classroom and online instructional activities as suggested by Moore (1993) who argued that quality of learning concerns learning interaction in both forms of face-to-face and online. When the learning process involves online instructional activities it is imperative that the researcher obtains the students, teachers and other partakers of the online learning environment prior knowledge and familiarity in engaging in the online learning environment. This measure is important in order to avoid further technical and pedagogical complications that may surface due to poor exploration of the analysis phase. In a study by Curtis and Lawson (2001), a majority of comments from students who engaged in forum discussions indicated that they were uncertain when to resume a discussion thread and when to initiate a new discussion thread.
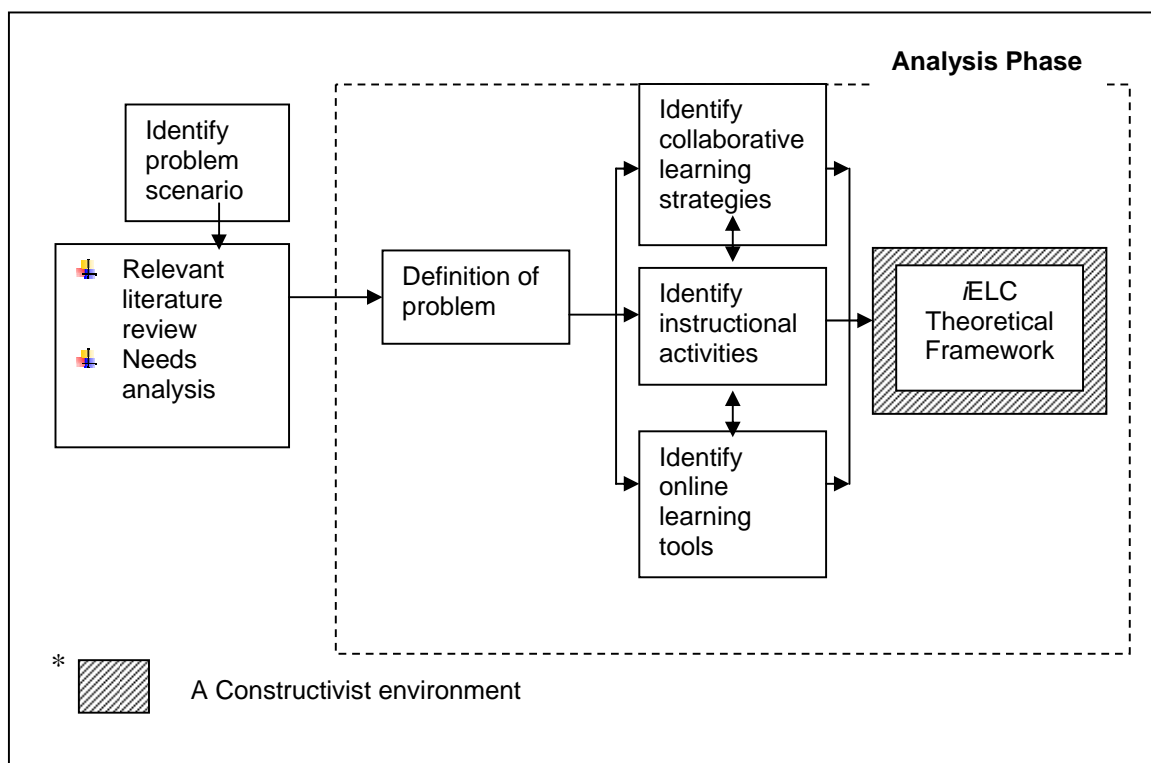
Figure 1: Model of analysis phase

The design phase consists of several consequential, relevant measures similar to the analysis phase. It is imperative for these measures to be responsive to the analysis phase to allow for continuity of reciprocal development between phases. The design phase looked into designing the identified learning skill enablers, classroom and online instructional activities. This model of the design phase can be adopted by ODL and other similar studies by substituting the collaborative learning variable with the intended measured learning variable. Again, comprehensive review of literature and discussion with more experienced peers will lead to effective design of the measured learning variable enablers. In context of this study, the need for integration on the collaborative learning enablers, classroom and online instructional activities can be explained with Moore's (1989) argument on the three types of interaction that all learners should be exposed. These three types of interaction that every learner should be exposed to are interaction between peers, interaction with experts (teachers, lecturers) and interaction with content. Moreover, in the context of learning through technology supported learning environment (such as the Internet, emails, and online databases) there is the need for focus on the fourth element of interactions which Hillman (1994) labels as the learner-interface interaction. Table 1 below provides a matrix of these aforementioned interactions with the components of the
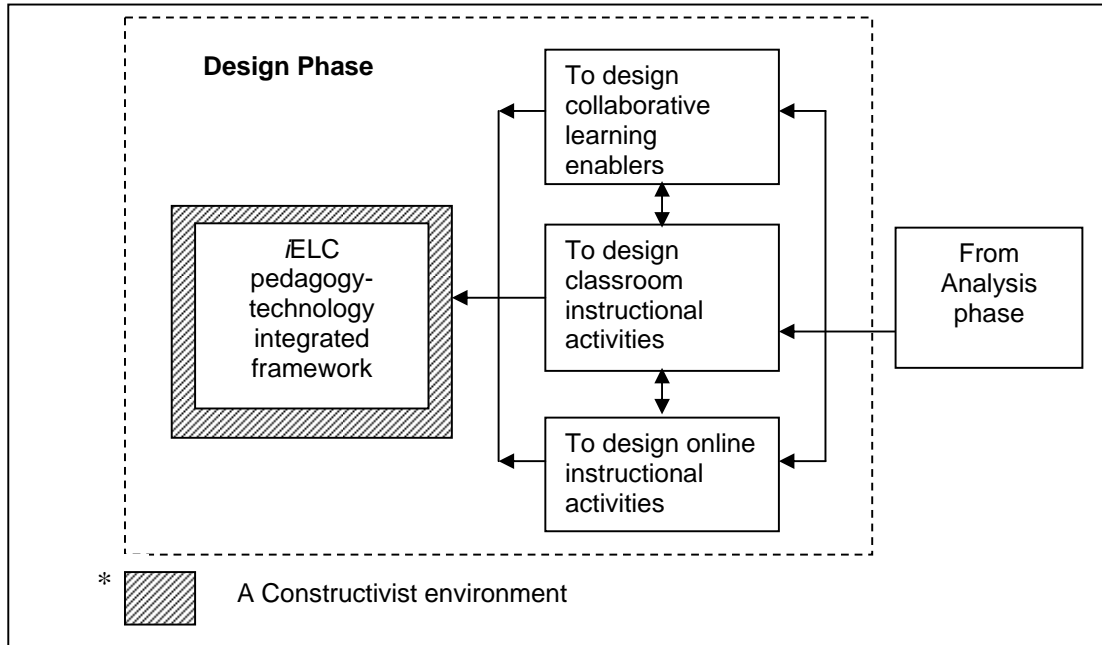
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proposed design phase model. This design phase model proposed is also applicable to ODL which requires subtle integration of these learning interactions. Moore and Kearsley (2005, p. 2) provide an inclusive description on the need of incorporating these learning interactions to the ODL process. They argued that "distance education is planned learning that normally occurs in a different place from teaching, requiring special course design and instruction techniques, communication through various technologies, and special organizational and administrative arrangements. Consideration of this statement is particularly essential with the recent attention and development of online technologies. Mason (1994) accentuates on the face that effective practice of interaction leads to augmented level of motivation and awareness that strongly facilitates the learner in the learning process.

	Interaction with peers	Interaction with experts	Interaction with content	Learner-Interface Interaction
Collaborative learning enablers	Discussion about the Physics learning content with peers and teachers through classroom and forum discussions			
Classroom instructional activities	Students get to discuss with peers face-to-face on solving Physics problems	Students get to seek advice from teachers on how to solve a Physics problem	Textbooks and modules to assist in the learning process	N/A
Online instructional activities	Students get to discuss with peers from difference exposure and understanding of the Physics content	Students get to receive different views from teachers with different teaching methods	Questions and answers posted in the forum discussion board	Forum discussion board, chat and dialogue tools
	Allows for critical perspective to a Physics problem			

Table 1: Matrix of design components with types of interactions

The development phase looks into realizing the collaborative learning enablers and instructional activities identified in the design phase through the means of classroom and online approach. Two crucial factors were identified to ascertain the effectiveness of the *i*ELC discussion platform in advancing the collaborative learning support and to create conducive blended learning environment. Again, these two factors play an important role in the development phases of any ODL systems. First, there needs to be an unbiased commitment on all account of the types of interactions. This need was clearly explicated by Moore (1989, p. 4) in which he emphasizes that, "the main weakness of many distance education programs is their commitment to only one type of medium. When there is only one medium it is probable that only one kind of interaction is permitted or done well. While the correspondence gives superior learner-learner interaction and good, though slow, learner-instructor interaction, it gives no learner-learner interaction." In the latter statement Moore stressed on the need for learner-learner interaction which reiterates and justifies the obligation of collaborative learning support in any teaching and learning endeavor. Second, it is important to conduct continuous formative evaluations at identified intervals of a study or development of an ODL system. In this study, formative evaluations were conducted

within and between phases to ascertain optimal exercise of the collaborative learning enablers, classroom and online instructional activities. Table 2 below provides a matrix of within-phase and between-phase formative evaluations conducted at the analysis, design and development phases.

Figure 2: Model of design phase

Phases	Formative Evaluations	
	Within-phase	**Between-phase**
Analysis	Assessment on the identified collaborative learning strategies, instructional activities and online learning tools in the learning in terms of its feasibility and integration in the learning process. Assessment on the availability of technical infrastructure such as time taken to download instructional materials, the Internet broadband and sharing of server.	Assessment on continuity of study interests from the analysis phase to the design and development phases. To return back to the previous phase if the trial run with the focus group indicate a need for improvement.
Design	A trial run with focus group on the feasibility of the designed collaborative learning enablers, classroom and online instructional activities.	
Development	A trial run with focus group on participation with the ÆLC discussion platform which includes both the classroom and online approach	

Table 2: Within-phase and Between-phase formative evaluations
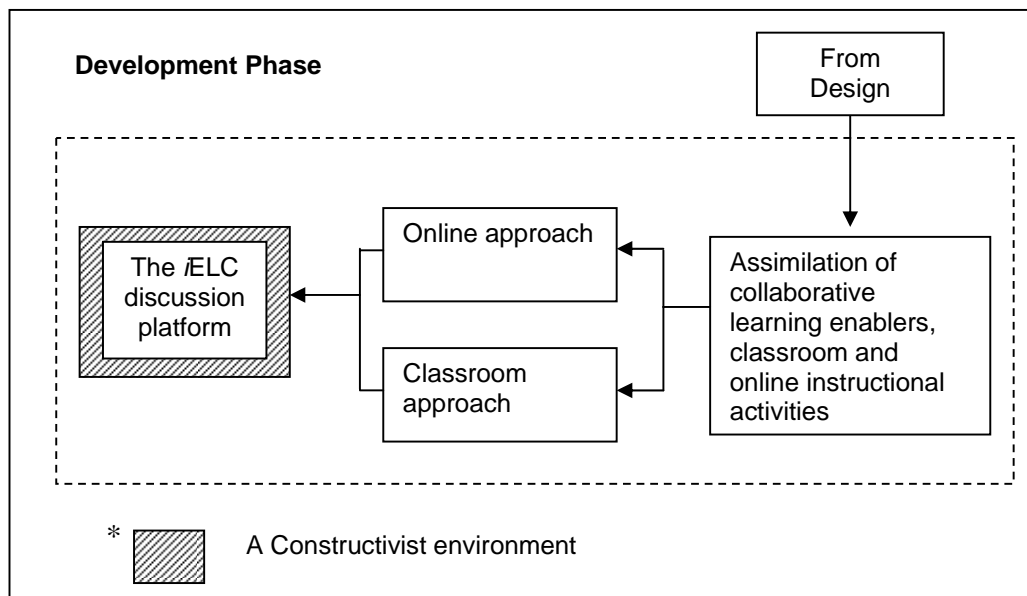
Figure 3: Model of development phase

CONCLUSION

Curtis and Lawson (2001) argue that online interactions and face-to-face discussions differ on some very important grounds. This leads to the need for a model of design and development phases that is able to act as a fundamental guideline. The key element that discerns this proposed model with others is the reciprocal association between the identified learning skill, the instructional activities and the online learning tools. In affirmative observation of some home grown ODL platforms there appears to be a weak, if none, mutual association between these aforementioned factors which are a must in any e-learning projects. Again, this reciprocal association is crucial because it encourages confluence of learning skills, pedagogy and technology.

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