MENTORING DISTANCE LEARNERS: AN ACTION RESEARCH STUDY

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ABSTRACT

Despite the recognized need for appropriate management of intellectual capital [Wriston, 1992] the majority of organizations face the enormous challenge of supporting their employees' thirst for expanding their skill-base. As a result, universities and organizations are currently collaborating to implement successful training and learning programmes in order to develop employee skills and knowledge in both IT and managerial issues such as knowledge management (K.M). For this reason, as early as 1993, University College Cork introduced a diploma in Credit Union studies to provide professional training for a range of credit union personnel including full-time staff, directors, and volunteers. The course is designed on a distance-learning model and has been supported, to date, by a tutorial-system in regional centers. However, students identified a need for more support, the type that only a virtual learning environment can provide. This research study is focused on the development of an interactive learning environment to mentor distance learners. The case study indicates a strong requirement for the utilization of such an environment to both increase support for and collaboration between the distance learners. We conclude that a structured communication system has the potential to eliminate the barriers imposed by the traditional classroom.

1. INTRODUCTION

Traditional training has always incurred criticism, it is felt that despite huge advances in technology, the classroom will always remain the same, that is, dysfunctional [Banathy, 1994; Reigeluth, 1994]. In "lay terms', traditional training, is regarded as a training environment which encourages passive learning [McCormack and Jones, 1997], does not develop problem-solving skills and ignores the individual needs of the learners, [Hannum and Briggs, 1982], therefore it ignores the requirements of its End users. It could be argued that advances in technology, such as multimedia and virtual simulations [Nisbet and Entwistle, 1973], have left the traditional classroom trailing behind with

learners expecting more and more [Driscoll, 1998, Davie and Wells, 1991]. The intensity of competition in the business market advances in technology [Crossman, 1997], and a strong shift towards a knowledge-based economy have each contributed to the demand for virtual learning environments [Harasim et al. 1995]. "*There is no knowledge that is not power*", [Emerson, 1843] and the organization (public or private) that can utilise its knowledge resources more effectively than its competitor will persevere [Laudon et al. 1998]. An effective training support system can provide an organization or a university with a strategic advantage in the market [Benjamin and Blunt, 1993]. Learning environments can help create and maintain skills and therefore the corporate knowledge base [Garvin, 1993]. They both alleviate the strain on corporate resources and facilitate employees changing training needs [Driscoll, 1998].

This paper focuses on the design of a suitable environment to support distance learners and encourage collaboration. The research outlines the factors necessary for the successful implementation and use of the system, through the investigation of current research and the analysis of the case environment. It also highlights the potential of the system to overcome the physical barriers of the traditional classroom. Distance-learning environments (DLEs) can, when properly mediated and structured, facilitate co-operation [Entwistle, 1997], reduce conflict and avail of all of the benefits that technology can provide [Johnson and Johnson, 1990]. The authors also identified an interesting paradox; learning environments are customized for the needs of the individual learner yet are built to promote collaboration. The study concludes that learning environments or Web-based mentoring systems (WBMS) have the potential, when properly designed, to foster learning. Further research would also indicate the justification of this system in increasing co-petition.

2. THEORETICAL FOUNDATION

Weiser [1991] argued that, "*the most profound technologies are those that disappear. They weave themselves into the fabric of everyday life*". Technology can and does aid groups, be they educators or students, [Hiltz and Turoff, 1985] but it is not as profound as the textbook [Caroll, 1968]. Video conferencing, multimedia, learning systems and Internet based training (IBT) are examples of technologies that are having a profound impact on training, however they cannot be labeled as 'profound'. At the same time, computers are seen as a merger of hardware, software and networks through the Internet to form learning communities [Dede, 1996]. This alternative is becoming a profound medium for instructional delivery [Harasim et al, 1995]. Human interaction through networks facilitates the break down of communication barriers and inhibitions that often stifle the open exchange of ideas in traditional classroom groups [Cuban, 1993; Damarin, 1993; Eisenberg and Ely, 1993].

2.1. Groups

Groups are defined as people who are aware of one another and have the opportunity to communicate [McGrath, 1984]. The study of people as individuals and in groups started as early as the 19th century. For example, Gustave Lebon [1896] investigated the absorption of individuals into a crowd, loosing their personality and adopting the collective mind of the group, be it a departmental group [Huczynski and Buchanan, 1985] or a group of students. The behavior of individuals will change in the presence of other individuals [Argyle, 1994; Adam, 1999], it has long since been established that individuals can be expected to perform better or worse when they are observed or supported by others [Baron and Byrne, 1977]. The role that groups come to play in their organization or university cannot easily be tied down to simple models [Adam, 1992]. Organizations and the functional areas within evolve over time and the result is rarely a neat arrangement of groups and procedures [Brown and Magill, 1994; Strassman, 1995]. The word group seems to suggest co-operation and collaboration in any environment be it organizational or educational. However, research is full of as many examples of conflicts as co-operation [Putnam and Poole, 1987; Easterbrook, 1991]. Easterbrook [1991] argued

that chaos and anarchy are more reliable models for human interaction than any other to provide a basis for the design of a computer supported communications systems. Communication doesn't necessarily encourage collaboration, for example, discussion forums can, if not properly structured, result in information overload and therefore structural chaos; ten threaded replies can result in ten thousand unstructured responses and queries.

2.1.1. Group Decision Support Systems (GDSS)

GDSS can be seen as outside the frame of this research study, which is not concerned directly with decision-making but with the development of a distance-learning environment. However, it needs to be addressed as a technological means to enhancing communication between learners [Adam, 1992]. DeSanctis and Gallupe wrote a milestone article on GDSS in 1987 where they defined them as combining "*communication, computing and decision support technologies to facilitate formulation and solution of unstructured problems by a group of people*" [DeSanctis, 1987]. In this context, the GDSS aimed at improving the process of decision making within the group by "*removing common communication barriers, providing techniques for structuring decision analysis, and systematically directing the pattern, timing or content or discussion*" as would a DLE. To date, researchers have identified several benefits. First, GDSS seem to be able to reduce the inhibitory behavior of participants, especially thanks to the possibility to contribute anonymously to a forum. Second, GDSS seem to solve the issue of dominance and inequality of participation by imposing an equal weight on all the propositions [DeSanctis, 1987]. Siegel et al. also found that GDSS improve the overall communication efficiency thanks to the speed and flexibility it allows: "*instantaneous and simultaneous transmission of messages, participants do not have to take turns to speak…*"[Siegel et al. 1986]. DeSanctis and Gallupe expected that the lack of social cues inherent in the electronic communication could "*encourage open input of creative ideas, discovery of optimal solutions, and selection of an alternative based on its merit rather than on compromise*". The effectiveness of GDSS or any other communication network (human or technologically based) remains largely to be proved except in special cases [Huseman and Miles, 1998] of spatially separated participants (distance learners) where the alliance of GDSS and telecommunications can make it easier and faster to reach consensus (WBMS).

2.1.2. Benefits of Structured Communication

The benefit of online communication emanates from its potential to provide structure to the human communication process within groups [Hiltz and Turoff, 1985]. A learning environment, using for example, discussion forums where a communication structure is not specifically designed and imposed on the learners will, to be successful, need to result in an emergent structure. Increases in student or employee numbers necessitates structuring in both the virtual and the traditional classroom. Structured communication provides both the educator and learner with the following advantages: (1) access to expertise without conforming to the opinion of the group; (2) anonymity of the participants through the medium of distance [Hardy, 1957; Allen, 1965]; (3) opportunity to participate in a large group; (4) feedback mechanisms between the teacher and the student; (5) a mediator to assure the flow and value of the discussion; (6) rules to govern the communication process and (7) some type of motivation, either academic or for promotion purposes. If these are incorporated into any learning or communications network the system will succeed in supporting the learner.

2.2. Distance Learning

Distance learning has been defined as "*any type of learning outside the more traditional learning environment*"; it is education that connects the participants through technology [Harasim et al, 1995; Dede, 1996]. Traditional learning is characterized by the classroom effect, with the instructor at the top of the classroom explaining the topic while the students listen [Cuban, 1993]. By contrast, distance

learning involves anything from watching a video, loading a tutorial from a CD-ROM, to enrolling in a virtual classroom [Harassim, 1990; Harris, 1994]. However, each type of distance learning has three factors in common: distance between the instructor and the student; opportunities offered by technology for different delivery techniques and expectations on the student to work largely independently [Harasim, 1990; Teles and Duxbury, 1992]. The goal of a learning environment is to create a community of learners [Davie and Wells, 1991; Harasim et al. 1995] co-operating to achieve a common objective [Johnson and Johnson, 1990]. The traditional classroom environment emphasizes the interaction between the educator and the learner [James, 1958; Laurillard, 1993], however collaboration is not as emphasized as it is in distance learning [Kaye, 1991; Dede, 1996].

Mentorship is a traditional method of teaching that strengthens the concept and objectives of distance learning [Benton et al. 1995]. The Oxford dictionary defines the word mentor as a "*wise counselor, who tutors the learner in intellectual subjects.*.". When, this model is, applied to a learning network, the student is called a teleapprentice who studies using appropriate methods [Levin, 1990]. The teleapprentice reads messages, answers questions, participates in discussions and conducts research online to master his or her subject. Mentorship is a method of teaching that has been used for hundreds of years; this design is incorporated into learning networks to develop more effective learning practices [Eisenstadt and Vincent, 1998] and provide additional support and mediation to the learners [Alexander, 1995]. 'Access to experts' is one of the many advantages provided through learning networks [Harasim, 1995]. Networks are, in fact, modeled on this method [Harasim et al, 1995]. Therefore, distance-learning environments (DLEs) allow students to communicate with experts in a field and collaborate with their peers [Dick and Reiser, 1989; Crossman, 1997].

Another component intertwined in the distance learning methodology is group collaboration [Wells, 1992]. The collaborative model assigns specific roles in the learning environment, and each participant communicates through the network [Luetkehans et al., 1996; Driscoll, 1998]. The roles of educators and students are changing [Jonassen et al, 1996; Driscoll, 1998]. Learning networks enable both the student and the educator to expand the time, place and pace of education [Harasim et al, 1995]. This method is more individualized when compared to the traditional classroom [Teles and Duxbury, 1992] while peer interaction and collaboration are also emphasized [Wells, 1992] resulting in a learning paradox. The distance learning system is designed to provide greater support to the individual learner allowing everyone the opportunity to speak without conforming to the pressures of 'face to face' communication and conflict. But it also allows the learners to anonymously share ideas and pose queries to one another [McCormack and Jones, 1997].

2.3. Web-based Mentoring Systems (WBMS)

Web-based Mentoring Systems (WBMS) can be described as learning delivery environments in which the WWW is its medium of delivery [Crossman, 1992; Driscoll, 1998]. The possibilities of WBMS are limited only by constraints imposed by the university or organization in question, such as technological or managerial support [Neville, 2000]. Innovative companies and universities are using this implementation for a number of reasons, specifically to keep employees or students abreast of emerging technologies in their fields and to provide effective training to both staff and customers on new products and skills [Khan, 1997]. Designing a WBMS requires a thorough investigation into the use of the Web as a medium for delivery [Ritchie and Hoffman, 1996; McCormack et al. 1997; Driscoll, 1998]. The designer must be aware of the attributes of the WWW and the principles of instructional design to create a meaningful learning environment [Gagne et al., 1988; Driscoll, 1997]. The Web-based classroom is viewed, as already stated, as an innovative approach to teaching [Relan and Gillani, 1997]. It, like the traditional method, requires careful planning to be both effective and beneficial [Dick and Reiser, 1989]. As stated by McCormack et al [1997] *a Web-based classroom must do more than just distribute information....* it should include resources such as discussion forums to support collaboration between learners and ultimately it should also support the needs of both the novice and advanced learner [Sherry, L, 1996; Willis, 1995]. A WBMS is composed of a number of

components that are integral to the effective operation of the environment [Banathy, B.H, 1992], for example the development of content, the use of multimedia, Internet tools, hardware and software [Reeves, 1993a]. A developer must understand the capabilities of these components (search engines, feedback pages and movie clips) as their use, will determine the success or the failure of the learning environment [Driscoll, 1998].

2.4. Effective Dimensions in WBMS Design

Distance learning is regarded as the 'silver bullet' solution to training issues faced by organizations, despite little quantitative evidence to support claims of its effectiveness [Huseman and Miles, 1988]. Therefore, it is essential to define the characteristics of interactive education that can be achieved through the WWW [Shotsberger, 1996] and expand the distance learning concept to promote mentoring. The identification of these characteristics is necessary to implement such a concept. Thus, this section reviews ten dimensions proposed by Reeves and Reeves [1993] for interactive training and collaboration: (1): educational philosophy, (2): learning theory, (3): goal orientation, (4): task orientation, (5): source of motivation, (6): role of the teacher, (7): metacognitive support, (8): collaborative learning, (9): cultural sensitivity and (10): structural flexibility. The dimensions are proposed to describe the characteristics of a WBMS. Each of the dimensions identified are outlined in the next paragraph:

(1) *Educational philosophy* ranges from strict instructivist to a radical constructivist structure, in the approach to training [Kafai and Resnick, 1996]. Instructivists debate the importance of identifying objectives that exist apart from the learner. Once the developer has identified the objectives they are ordered into a type of learning hierarchical structure, addressed through direct instruction. The learners are viewed as passive recipients of the devised instruction. Instructivists believe that learning consists of acquiring knowledge and that knowledge can be measured through testing [Phillips, 1993]. However the constructivist structure is a direct contrast to this philosophy. The learner is regarded as the focus of the learning and the learner's intentions, experiences and cognitive strategies must be considered [McCormack et al, 1997; Driscoll, 1998]. This philosophy also emphasizes the belief that learners build their cognitive strategies on previous knowledge and on the learning environment. Therefore a rich and stimulating environment is required to train the different adult learners. Thus, direct instruction is also replaced with challenging tasks. The constructivists' belief is that the learners have their own objectives and must be motivated to use the environment [Sano, 1996; McCormack et al. 1997; Driscoll, 1998]. However, the majority of WBMS are based on the instructivist structure of direct learning, but there are online resources that enable learners to build their own knowledge base, for example discussion forums.

(2) The design of the environment should be based on researched *learning theories* [McCormack et al. 1997]. The two dominant theories identified in the design of training environments are behavioral and cognitive psychology. Behaviorists believe that the most important factors that should be taken into consideration are the arrangement of stimuli, responses, feedback and reinforcement to shape the desirable behavior of the learners. Therefore, the design of the WBMS should provide a stimulus (a question) that requires some sort of response, if the desired answer is provided the learner receives a reward. Inaccurate responses will result in the repetition of content. By contrast, cognitive psychologists place more emphasis on internal mental states rather than on behavior, [Kyllonen and Shute, 1989]. As a result, the WBMS design, using cognitive theory, will be based on direct instruction and practice exercises [Dede, 1996].

(3) The *goals* for a WBMS can vary from sharply focused, where a specific environment is required to a more general approach [McCormack et al. 1997; Driscoll, 1998]. Cole [1992], states that knowledge "*has undergone extensive social negotiation of meaning and*

which might most efficiently be presented more directly to the learner", in this instance direct instruction will suffice. WBMS can also avail of both direct instruction and other training facilities such as a cognitive tool, [Joassen and Reeves, 1996; Brandau and Chi, 1996].

(4) The orientation of *tasks* can range from academic to authentic. The majority of WBMS emphasize the importance of context [Brown, Collins and Duguid, 1989], thus the majority of the environment's tasks are academic but they can be developed to focus on the needs of the learners (authentic). An academic oriented environment will be designed to provide exercises based on the material taught (explicit knowledge). By contrast, an authentic design, for adult education, would require the learners to tackle job related exercises or cases (tacit knowledge). The design orientation of a WBMS should support the transfer of skills to the learners.

(5) *Motivation* is the main factor for the success of any learning environment. The source of motivation ranges from two extremes, from extrinsic (outside the learning environment) to intrinsic (a part of the learning environment). The motivation of the learner to use the environment can be difficult to identify, but it must be considered in the design of the WBMS [Sano, 1996; Driscoll, 1998]. Proponents of distance learning and therefore mentorship argue that components such as content and multimedia will motivate the users but studies have indicated that learners become bored with flashy elements, [Reeves, 1993]. Therefore learners must be provided with a reason to use the environment, such as extra academic credit or as an aid to promotion.

(6) Lecturers and tutors fulfill different *roles* from the traditional role of instructor (didactic) to the facilitative role. Caroll [1968], states that, "by far the largest amount of teaching activity in educational settings involves telling things to students", to describe the role that lecturers play in the learning environment. However, the role of the lecturer has not changed despite an increase in the use of technology to deliver information, they still fulfill the traditional role but also that of a facilitator. Therefore, the role of the instructor hasn't changed but has acquired more responsibility. Advances in technology are enabling the instructor to provide the learners with tools both to add material to the environment and to evaluate themselves. Discussion forums can be used to allow learners to add material in a logical sequence and online assessment used to provide the student with the option of testing their knowledge [McCormack et al. 1997].

(7) Flavell [1979] described *metacognition* as the learner's ability to identify objectives, plan and understand learning strategies. Therefore, metacognitive skills are the skills possessed by the learner in learning to learn. This type of support ranges from the unsupported, which is common practice, to the integrated. Thus, WBMS can be designed to challenge the learner to solve course related problems [Driscoll, 1998].

(8) The *collaborative* learning dimension for WBMS development can also range from lack of support to the inclusion of facilities to support it. In the traditional environment students usually work individually, however a collaborative environment would enable students to work and share ideas with one another while still supporting the needs of the individual learner [Harassim, 1995]. The WWW provides a medium to promote collaborative learning and therefore mentoring.

(9) Reeves et al [1993] argue that all training environments have *cultural implications*. However, the development of a WBMS cannot be designed to adjust to every rule. Therefore, WBMS should be designed to be as culturally aware as possible.

(10) *Structural flexibility* describes a WBMS as either asynchronous or synchronous [Driscoll, 1998]. Open or asynchronous environments refer to the use of such an environment at any particular time or from any location. However, synchronous refers to fixed environments

that can only be used in the training room of an organization. The WWW provides educators and students alike with the opportunity to avail of resources from more open environments through which students are supported or mentored in the acquisition of both tacit and explicit knowledge.

The dimensions were used as a guide to the implementation of the Web-Based Mentoring System (WBMS) illustrated in both Figures 1 and 2. Both the study of the different dimensions and the factors necessary for the collaboration and structure of learning provide valuable information and steps for the analysis and therefore the development of such an environment in supporting group and individual learning.

3. RESEARCH OBJECTIVE

This research study outlines the development and implementation of interactive Web-based mentoring systems (WBMS) to support the educational needs of distance learners. The authors propose to expand the design of the cases original tutorial system to provide a more innovative, virtual classroom that is more akin to the true essence of distance learning. The system will effectively enable tutors and lecturers to mentor the learners. Figures 1 and 2 illustrate the WBMS that has been created to support the learners' requirements, as determined through ongoing discussions and postal surveys. It is also the objective of this paper to examine the factors necessary for both successful implementation and learning. This will be achieved through the removal of the physical barriers imposed by the traditional classroom allowing the students and the educators to expand the time, place and pace of learning. Finally the authors propose to prove, in further research, that learning environments have the potential, when properly designed, to facilitate healthy co-opetition.

4. RESEARCH APPROACH

The research approach adopted for the study was based on a two-tier research design involving an in-depth investigation of the current tutorial environment and the development of the mentoring environment (WBMS) to expand the support or communication structure in use. The intention is also to further corroborate the value of the system in different environments.

5. BACKGROUND TO THE CASE

Education is central to the operation of credit unions and it was with this in mind that University College Cork introduced a distance-learning Diploma in Credit Union Studies in 1993. The diploma provides professional training to a range of credit union personnel including full-time staff, directors, and volunteers. It is designed to develop a critical awareness of the distinctive nature of credit union organizations and their role in promoting socio-economic development at community level. It also aims to develop further the knowledge and abilities of credit union personnel so that they can more efficiently organize and manage credit unions. The course is designed on a distance-learning basis and is supported by a tutorial system in regional centers. The main purpose of the tutorials is to facilitate the learning process, assist in the completion of assignments and build up a team spirit within the group. Students are presented with written modules, which act as 'the lecture', and the tutor plays the role of the facilitator, enabling the students to combine the written materials with their own credit union experience. Feedback from the students identified the need to provide additional learning support through an online environment. The WBMS would enhance the learning process and enable students from throughout the country to collaborate in supporting each other through the Diploma. This research study focuses on the development of these requirements through an interactive learning environment for students on this diploma.

5.1 Finding of initial research

This section presents the findings gathered during ongoing interactions between the organizers and students during the years. A recent postal questionnaire was designed and posted to each of the participants of the target group (30 past graduates) to determine their reaction to the possibility of an online environment to support future students, one devised to their specification. The information collected and analyzed by the researchers is presented in Table 1. The objective of this analysis stage was to determine the requirements of the participants in the study. The obvious finding of this questionnaire as can be seen in Table 1 is that the participants require an online support system or environment that can only be facilitated by the Web. Participants were required to scale their agreement or disagreement between 1 and 5. The maximum score on the construct is 1, indicating a strong agreement. Therefore the closer the rating is to 1 the stronger the agreement and a score of 5 would reflect the participant's strongest disagreement. The instructors were also questioned regarding their requirements and therefore the distance-learning environment (WBMS) designed to support their classes. The instructors were as optimistic as the participants regarding the predicted success of the environment and the affect of the learning environment on the success of the courses offered to future adult learners.

WBMS Requirements	1	2	3	4	5
A Web-based Mentoring System	6	5			
Online discussion forum	4	5	2		
Online quizzes and sample questions	6	5			
A Relevant Links page that allows you to search for links	5	6			
A links page that allows you to add relevant links	2	8	1		
Lecturer /Tutor pages with notes etc.	8	2	1		
Further information about the course	6	3	1		
Online notice board	6	3	2		
Submission capabilities for assignments	8	2	1		

(1 = mostly agree - 5=mostly disagree)

Table 1: WBMS Requirements (Postal Survey)

6. THE WEB-BASED MENTORING SYSTEM (WBMS)

The WBMS (see Figure 1) was constructed to support and implement Third Level courses for Credit Union personnel seeking to acquire knowledge management (KM) skills. Various material is available on-line, but in addition, a discussion forum will enable both instructors and students to exchange ideas and add to the environment. This will allow adult learners to provide feedback (anonymously, if desired) to the instructors. It will also enable them to pose queries, which other participants or the instructors can answer. All participants will be able to see the initial queries and the discussion stream of answers from other participants and the instructors. This will further extend the reach of the course as students can log on to the WBMS at home or at their work and pose questions for which answers will be available when they next log on. The facility will also allow the adult learners to voice their satisfaction regarding the different elements of the environment. This will provide the participants with the opportunity to take part in the ongoing design of the WBMS, and therefore increase the likelihood of user acceptance.

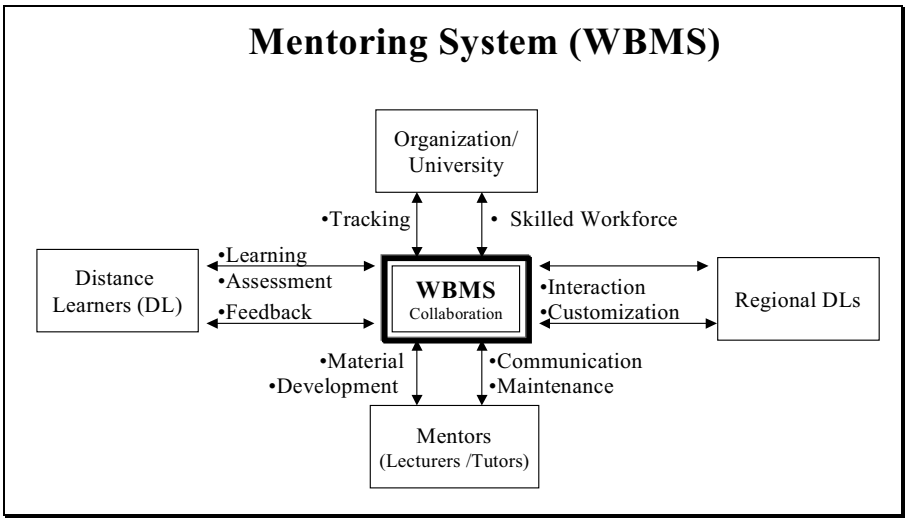

Figure 1: The Web-based Mentoring System (WBMS)

Figure 1 illustrates the opportunities available to the participants of the case. WBMS are designed or customized for the requirements of the individual learner. The learning abilities of students vary and the traditional classroom is restricted to rules to facilitate the group. The educator instructs a class, but the level of both collaboration and the development of problem-solving skills can be directly correlated to class sizes. The greater the size of the group the less attention individual learners gain or the more intimidated a student is to participate in discussions thus reducing collaboration. The WBMS when adequately designed can reduce the limitations of the classroom and allow the student to work at their own pace with structured support from both the educators and the other learners. Figure 2 describes the numerous possibilities that can and will be provided through the online environment.

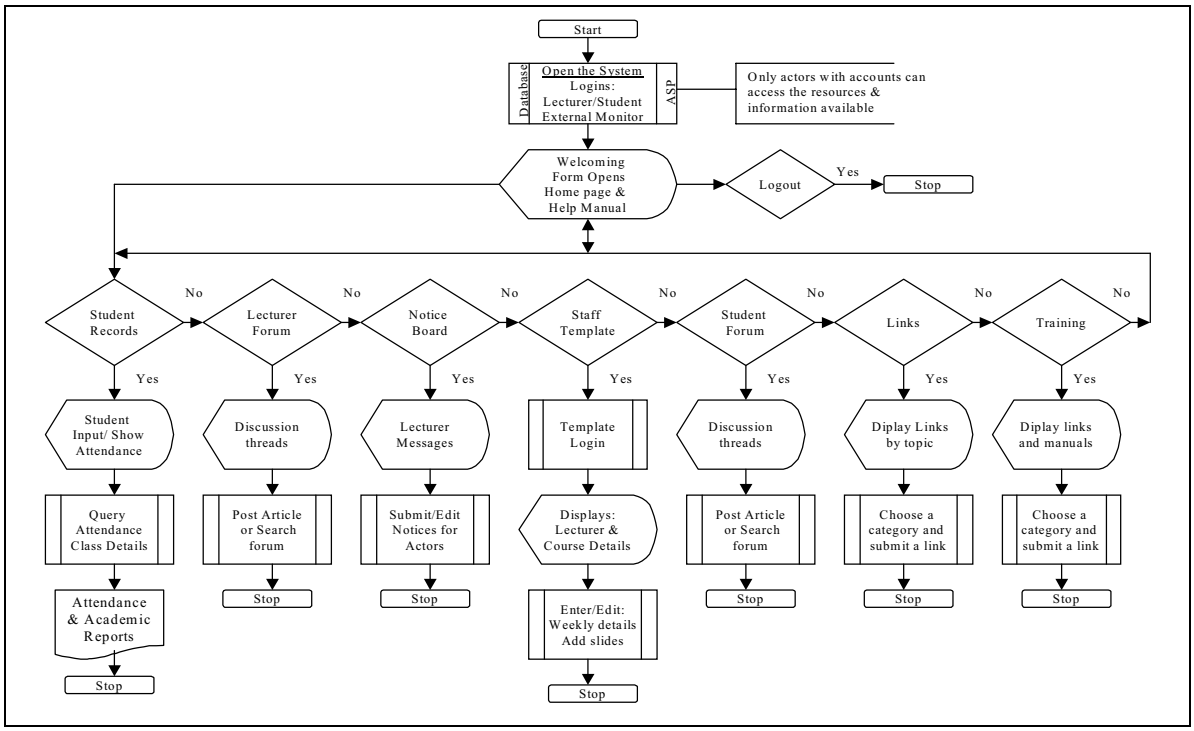

Figure 2: A Detailed Outline of the WBMS

7. CONCLUSIONS

Over the years students past and present have praised the hands on approach provided through the instructor driven system. The organizers of the course have always requested feedback from both the instructors and the students. However, through raised concerns regarding increased student numbers and research into strengthening the instructor / student association (mentorship), a current investigation identified a web-based mentoring system (WBMS) as a solution. The environment provides an extra communication channel as the number of students applying for the course is constantly increasing. It also enables the tutors and students to collaborate, therefore, providing 24-hour online support.

A number of important conclusions can be drawn from this research, which depicts a clear guideline (Figure 2), for the development of a WBMS. The development of a WBMS presents enormous challenges to both academics and management in determining distance learners support requirements and eventually benefiting from the support environment. This case is a prime example of a successful course that can and will be availing of technology to ensure ongoing success. After an in-depth analysis it was apparent that the learners lacked an efficient online support system, which would complement the traditional tutorial-system currently in place. An effective training support system can provide an organization or a university with a strategic advantage in the market. Learning environments can help create and maintain skills and therefore the corporate knowledge base. They both alleviate the strain on corporate resources and facilitate employees changing training needs. This paper focuses on the design of a suitable environment to support distance learners and encourage collaboration. The research outlines the factors necessary for the successful implementation and use of the system. It also highlights the potential of the system to overcome the physical barriers of the traditional classroom. Distance learning environments can, when properly mediated and structured, facilitate co-operation, reduce conflict and avail of all of the benefits that technology can provide.

Previous research into communication systems such as GDSS have identified both the advantages and disadvantages associated with their use. However, the use of communication or learning systems have never been justified by proving that they can remove the barriers associated with the traditional classroom, increase group collaboration without ' face to face' communication, foster co-opetition, and eliminate conflict from the learning process. Further research would also indicate the justification of this system in increasing co-opetition. It is the intention of the researchers to measure the level of both collaboration and competition (co-opetition) generated as a result of the implementation of a WBMS into suitable case environments.

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