Some Important factors for Designing Semi-Autonomous Learning Environments

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Abstract –**The aim of this research is to propose solution of the question, "in what ways do mediated learning environments support or hinder learner autonomy?"**

Learner autonomy is an important factor in the success of mediated learning environments. The central aspect of learner autonomy is the control that the learner exercises over the various aspects of learning, beginning with the decision to learn or not to learn.

The first are the motivational-intentional forces that drive the learner to apply some determination to the act of learning. They are the cognitive functions of learning and include learner initiative, motivation and personal involvement.

The second area of learner-control is the one comprising the "nuts-and-bolts" of the act of learning, such as defining learning goals, deciding on a learning sequence, choosing a workable pacing of learning activities, and selecting learning resources [5]. We will examine the implications of each of these areas of learner-control, and share our analysis of a series of interviews with cyber-learners, based on this framework of cognitive, algorithmic, semiotic and economic factors.

Keywords – **self-directed learning, learner autonomy, educational policy, international development.**

I. INTRODUCTION

Early attempts at defining features of Distance Education have stumbled upon an interesting conundrum. Some authors [6], pointed out that printed material mailed to a distant location increased pressure on the learners to set their own schedule and to work around deadlines imposed by the teaching institution. This feature, juxtaposed to the fact that distance education shows one of the highest drop-out rates among all educational environments, led to the supposition that distance learning requires some higher degree of learner autonomy than traditional classroom instruction. Indeed, lack of autonomy was considered the main reason why students failed or discontinued their programs.

Another feature of Distance Education was identified as the constraint imposed on institutions to produce a standard learning program that will be followed by all learners in the same sequence, usually within a set of prescribed deadlines [4]. This institutional standardization, inevitably, is then passed on to the learner. In this respect, distance learning environments can be said to *constrain* the expression of autonomy among learners and instructors alike, at least when compared with traditional environments where components of the program may be modified in response to learner feedback or other considerations.

The question of whether a specific learning environment will support or hinder the expression of autonomy is an important one for educators. Contemporary literature in adult education has focused on learner self-direction as a core value associated with the notion of facilitation, rather than the dispensation of learning [7].The point here is not to retrace the steps that led to the emergence of learner-autonomy as a strongly held value among adult educators, but merely to situate our study within its context. It is our view that the quality of any learning environment is to a significant extent dependent on the degree to which that environment acknowledges the need to support learner self-direction.

Interestingly, these quotes point to very different aspects of learner autonomy, the central one being the *control* that the learner exercises over the various aspects of learning, beginning with the decision to learn or not to learn. But as Candy points out, there are other specific areas where learner-control can be exercised.

II. PEDAGOGICAL END PSYCHOLOGICAL ASPECTS OR THE AUTHORS

The question, then, is to investigate the "areas" of learner control. How many are there? How do they intersect with the specific features of D. E. environments? What are their implications for adult learning?

According to [8], the first area includes the motivational-intentional forces that drive the learner to apply some determination (or "vigour") to the act of learning. What Huey Long called the 'psychological' aspects of learner autonomy will be referred to here as the *conative* functions of learning.

The second set of elements identified by [8] as a subset of learner autonomy were the "pedagogical" aspects of learning. These involve the control over the "nuts-and-bolts" of the act of learning, such as defining learning goals, deciding on a learning sequence, choosing a workable pacing of learning activities, and selecting learning resources [5]. These elements can be grouped under the more precise heading of *algorithmic* aspects of learning. In traditional learning environments, most of the algorithms are the responsibility of a teacher or a teaching institution. Learning goals, student workload and methods of evaluation are usually stipulated at the outset and little participation in their formulation is expected from the learner. Any derogation from this approach entails devolving to the learner, on top of the expected "learning tasks", at least

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some of the "teaching tasks" normally reserved for the instructor. In this sense, we can say that autonomy is directly related to the number and magnitude of the "teaching tasks" that are appropriated by the learner [10]. Most mediated learning environments require such participation from learners, albeit to different degrees and with varying results as will be described below.

A. Emerging dimensions

Just a few years ago, learner control was necessarily limited to these two sets of features, conative and algorithmic. After deciding whether, what, and how to learn, one had covered all areas where it was conceivably possible to exercise some degree of learner autonomy. Now with the proliferation of learning environments that include mediated instruction materials, exponentially available learning resources, new means of communication, and a marketplace literally exploding with learning opportunities, two other components of learning emerge as possible areas where learner control may be exercised – or impeded. We have namely identified the *semiotic* dimension learning, and the emerging *economics* of the knowledge marketplace.

Until recently, the prevalent medium for encoding, storing and disseminating knowledge was to provide access to print materials through libraries, mail-order programs, or custom-printed resources. Today, learning materials include rather diverse media which may share very few features with printed text. For example hypertext, asynchronous messaging and electronic whiteboards each possess their own set of codes and behaviors that are inconsistent with the linear quality of print. Furthermore, the manner in which each new medium is utilized by instructors and learners varies to some extent, leading to further diversification in the perception of their semantic possibilities [3]. For example, hypertext can be used as a way to link course materials to outside resources, or as an inherent part of the material to be learned, or then again as non-compulsory enrichment to the basic text such as illustrations or diagrams to be viewed when needed. From the learner's perspective, hypertext can be perceived as a convenient way to store and retrieve information, or as a bothersome irritant leading to feelings of frustration in the presence of overwhelming amounts of poorly organized data. Because each environment offers its own set of communication pragmatics and its own approach to using them, we can say that the semiotic choices made by designers and instructors are an integral part of the learner's experience, and as such offer opportunities to enhance or deter learner autonomy.

Learning is no longer the reserved province of traditional institutions such as schools or colleges. Indeed, it is now acknowledged that universities find themselves in direct competition not only with each other, but with a multitude of offerings from a thriving marketplace [9]. Today an important component of any learning environment is the perceived economic value of its knowledge in the marketplace, either as an asset for finding employment or as a means of production in the knowledge economy. Based on this consideration, learners must not only decide why and what to learn, but also where to learn it and who to learn it from. This decision will surely be based on factors like individual preference for a proposed learning environment, but ultimately the choice will rest on the perceived cost-benefit and opportunity cost which are generated by each alternative. In this context, we can observe that the *economics* of learning are emerging as an important component of learning environments.

The diagram in Fig.1 illustrates how learner autonomy can be divided in four areas of learner control: conative, algorithmic, semantic and economic. One useful feature of this representation is that it makes it possible to explore learner perceptions within different learning environments, while retaining a constant framework for analysis.

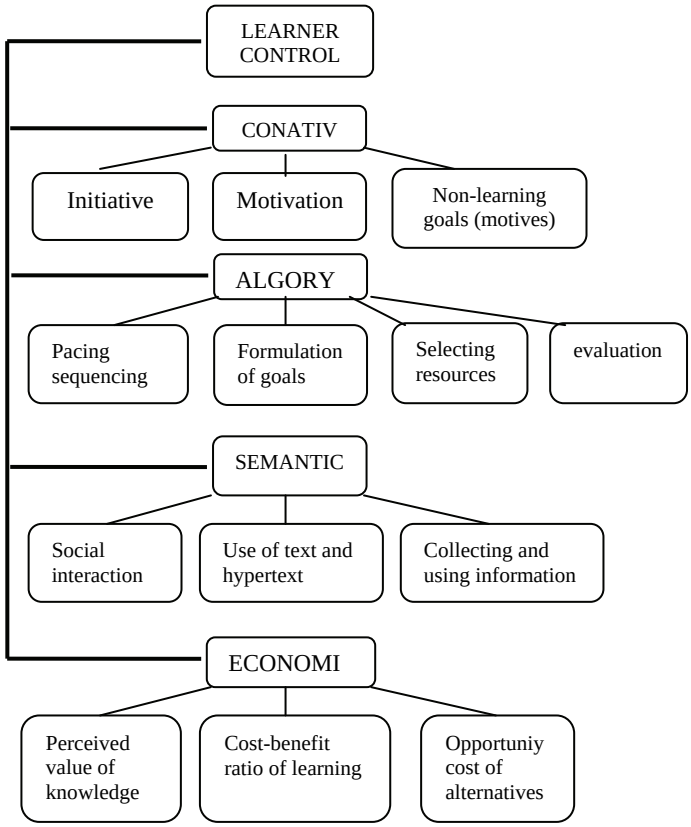

Fig. 2. Scope of learner autonomy

III. METOHODOLOGY

Open-ended interviews were conducted with 13 adult students registered in on-line courses in Psychology, Finance, Education, and Political Science. Questions were formulated to explore the four areas of learner autonomy, using everyday terminology familiar to the students.

The research question to be explored using this method was, more specifically,

> *"In what ways do mediated learning environments hinder or support the emergence and expression of learner autonomy?"*

The questions asked the informants were not as formally wordedl. We conducted semi-guided interviews generally purported to get some feedback from the students on their learning experience in on-line university courses. Interviews were taped, transcribed, coded and analysed using standard content analysis techniques. Coding was done by grouping units of meaning under tentative headings, and then combining the headings under generic titles using an emergent design method. The factors that determined the students' perception of each learning environment were categorized as: Interaction; Structure; Value; Context; and Media.

IV. FINDINGS

One of the first things that became apparent during the interviews was the diversity in the likes and dislikes of individuals concerning the various components of the learning environments. All courses were designed using online course materials, a messaging device and a textbook. Some used hyperlinks to other web-based resources, and none included classroom or face-to-face meetings. The individual preferences were polarized around the use of media, the course structure and the value of course content. Predictably, about half of the students said it took some effort to prevent inertia when facing the prospect of doing tasks online, in the absence of an imposed schedule.

A. Interaction

The portion of the course grade allotted for participation in on-line discussion groups varied between 0% and 40%. In the groups where there was less pressure to 'participate', students felt that the interaction was more meaningful and that they were more in 'control' of the environment. From the students' responses, it appears that instructors did not attach any weighting to the quality or tone of the interactions. This finding supports the notion that the *conative* aspects of learner autonomy in D. E. environments need to be further analyzed to include the subsets that are specifically linked to the characteristics of the environment itself. For example, while social interaction has been found to be one important factor in the motivation of learners, the type of interaction provided by chat-groups, e-mail and moodles need to be further explored.

B. Structurs

A few students who had a personal interest in their course topic spontaneously searched for alternative learning resources but overall, this was not a prevalent practice. All courses except one had set very specific objectives, thereby circumventing student participation in their formulation. When a learning goal was stated in general terms, mature students more readily established links with their own experiences and interests. Evaluation was done in much the same way as in classroom environments, participation in discussion groups being graded in lieu of attendance. Overall, students had difficulty evaluating their own learning, stating instead that they earned their grade simply by conforming to the course-work requirements. Students with poor performance tended to blame the "lack of clarity" of the course objectives.

Students admitted readily that they chose an on-line course because of the flexibility it afforded in their schedule. However, some found the prescribed pacing too slow, while others found it somewhat daunting, especially when assigned weekly readings – thus, scheduling became more of a problem than anticipated. The requirement to participate in online discussions was perceived as additional workload that would have been less demanding in classroom interaction. The detailed program structure found in all but one of the on-line courses was perceived to make the learning tasks more manageable, as they were relieved of any ambiguity.

This finding points to the importance of some important *algorithmic* features that are inextricably woven into the design of each D. E. learning environment. In most cases, we found that design features tended to reduce learner autonomy in very serious ways. Setting unalterable objectives, leaving all evaluation activities to the instructor, setting the same sequence of learning for all students independently of their individual needs or characteristics, all of the have detrimental effects on learner autonomy. In fact, this is the area where the most severe weaknesses were found in the designs we studied. Since there is no inherent reason why D. E. packages should limit autonomy so much, we need to ask ourselveswhy designers tend to appropriate for themselves such excessive control over the environment.

C. Value

Students can be placed in two groups according to the criteria they used to establish the value of their learning. The first group derived their estimation from the potential usefulness of their newly acquired knowledge in some immediate area of their lives, either by providing tools for better understanding world issues or financial matters, or by developing skills that apply to family relationships or the workplace. The second group was typically concerned with completing a university degree and selecting eligible courses for their anticipated convenience or easy workload. Interestingly, several students admitted opting for on-line courses assuming – wrongly they soon discovered – that they would entail a flexible schedule and a less demanding productivity. Some of the derived benefits were discovered as learning occurred throughout the courses. Others were identified as unanticipated spin-offs, such as developing better writing or computer skills. One student pointed out that his workplace offered a similar course package, featuring a better design and a lower cost, but that it could not be credited towards his university degree.

As in many institutions, the actual per-credit cost to the student is considerably higher for the on-line version of a course. Students generally accepted this fact with some resignation, but could not explain the disparity. One student realized too late that he could have learned independently, at

a much lower cost, everything that he learned in his course. Two other students acknowledged that they had chosen the institutional avenue in order to access the university's sophisticated computer labs. In light of these findings, we can say that the *economics* of D. E. are often poorly understood by institutional designers. In some instances, the cost associated with learning is in reality the hidden cost of giving institutional credit for learning that could have occurred anywhere. This gives rise to unnecessary duplication of courses that are offered in non-credit organizations (e.g. the workplace), or to the practice of granting dubious legitimacy for learning that otherwise could have been entirely self-directed, and therefore considerably less costly.

D. Context

Students were asked about the reasons they decided to enrol in their course, and why they chose the on-line version of the course. Factors such as desire to understand family issues, or the wish to improve work performance were mentioned by mature and non-degree students only. Reasons for choosing the on-line version of the course were mostly linked to personal, family and work situations. Somewhat ironically, the same factors were identified as barriers to achievement in the on-line course. The institutional context also was perceived to play a role, beginning with the fact that two versions of the course were offered by the institution, that the on-line version was higher priced but available, and that the absence of in-class meetings seem to motivate the instructors to increase student workload.

E. Media

In a previous study (Bouchard & Kalman, 1998), low computer literacy was identified as a barrier to distance learning. Here, students all had achieved reasonable competency at using computers. Some difficulties were encountered however with the consistency of access to the online environment. There were frequent system crashes and technical help was not always available. From the delivery point of view, the emphasis was placed on completing course assignments and little attention was paid to students' efforts to learn how to navigate within the system and outside. Some features of the courseware were used routinely, such as messaging and on-line exams, while others were rarely or not used (file transfer, self-corrected testing, live chat, transfer of images or animated *gif* files, etc).

This particular finding points to another area of concern for D. E. designers. There is a tendency to use technology and systems that are available, rather than those that are appropriate. This is attributable to a common management error that consists of making decisions based on past investments rather than future returns. As often happens with adult learners, they end up making their own decisions, and choosing for themselves *how* they will learn. This is the self-appropriation of the *semiotic* aspect of learning that is made possible when more than one technology is available.

V. Conclusion

The purpose of this study was to obtain from the learner's perspective some indication of the factors that encourage or deter from the development of self-direction in mediated learning environments. In light of the data collected, it is possible to make some recommendations that relate to the conative, algorithmic, semantic and economic dimensions of learner autonomy. Further analysis will allow us to produce a more detailed classification, but for now we will limit ourselves to a number of recommendations that are supported by our data. This information should be useful for planners who value, beyond the conformity to academic standards, the capacity for self-direction as a central goal of education.

On-line and other mediated learning environments offer much potential for supporting the development of self-directed learning skills, and can also be powerful deterrents. Realizing the potential – and reducing the deterrents – are possible if educational planners consider the importance of these two criteria when making instructional design decisions.

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