Who's In Charge?
A System of Scaffolds That Encourages Online Learners to Take Control

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Abstract

The teaching and learning "dance" is one that traditionally has been led by the instructor with the student following passively. Faculty members in higher education are entering the realm of online learning, many with the previous experience and hopes of facilitating student-centered, active learning experiences. However, due to factors that are integral to this environment, many are returning to their "comfort zones" by providing greater clarity and specificity, stricter accountability measures, and less student flexibility/personalization. To address best teaching practices in adult education within the online environment, a systems model of social, self-direction is presented that allows the student to "lead" and yet learn how to facilitate the self-direction process. This model was used as an instructional intervention in this study, which sought to answer the question: "What are the self-perceived learning gains of students engaged in a social, self-directed learning experience?" A self-rated pre-test/post-test design was utilized with the 8 course sections and 112 subjects that received this instructional intervention. Other data sources were also utilized as triangulation for validating the self-reported learning gains on both the breadth and depth of course material. The model was found to facilitate significant learning gains, while attending to university guidelines and course requirements. Further implications and questions that are resulting from this research are also explored.

Introduction

Online learning can be overwhelming and discombobulating for learners due to uncertainty and lack of clearly expressed expectation. However, in response to student requests for clarity in online environments, structure has been created by assuming a more rigid classroom approach that eliminates many of the benefits of virtual instruction. Rather than assuming new and innovative ways to respond to demands of online education, the trend is to assign quotas, dates, and accountability measures that minimize choice and encourage students to become the type of students that Ponticell and Zapeda (2004) term "compliant learners". This was substantiated in many presentations at a recent national leadership conference where faculty shared innovations in program development and course delivery via online environments.

Traditional approaches of lecture, readings, and testing do not successfully accommodate the best practices of higher education/adult education, which encourage active, engaged, and authentic learning experiences. Knowles' work provides a definition of adragogy and self-direction that can be used as a theoretical basis for incorporating adult learning principles into higher educational teaching practice (Knowles, 1975; Knowles, 1986; Knowles, Holton, & Swanson, 1998). The attributive, representative, and situational theoretical philosophies have been posited within the adult education field as different yet critical teaching and learning perspectives and are usually explored as divergent instructional methods. The model presented in this research integrates all three models to attend to learner characteristics (input attributive variables), process and meaning construction (process representative variables), and socially contextual interaction (process learning community, self and group metacognition, and outcome environmental variables) (McGough, 2003). While these practices are important regardless of educational delivery, the advent of online mediums has provided a platform for the exploration of innovative teaching models and an adaptation of "instructor" and/or "student" roles (Harvey, 2002; Jonassen, 2002; Moller, 2002).

Aligning instructional approaches so that online experiences provide both clearly expressed structure and a means for personal learning that incorporates self-direction, metacognition, and learning communities is not an easy linear task. Instead, learning in this framework must be viewed as a complex system where students are granted responsibility for planning, searching, finding and producing learning objectives, while instructors provide the scaffolds, resources, feedback, and expertise that is essential to connect system components. Within this framework, learning becomes an instructional dance, where students lead movements, direction, and pace while instructors follow in step, provide assistance, and enhance the experience. So the question, "Who's in

charge?" becomes difficult to discern as the swirling dance of learning is in progress, and one must wonder in this design whether the complexity is an exercise in futility, or whether breadth and depth of learning does occur.

Background

A model has been under design that provides both instructional technique and cognitive theory to accommodate the difficulties of structure provision and personal/group direction of learning. (See Figure 1). The systems model of social, self-directed learning considers input, process, and output, which result in outcome variables and is represented by the formula *(I+P+O=Ou)* (Boyer, 2003). In this model, it is hypothesized that a student enters a learning situation with a given set of input variables which include learning patterns, previous experience, content knowledge, personal interests, and a host of other characteristics. These input variables serve to mediate the instructional process that is designed for students in the online environment.

The process portion of the model is centered on individual and group metacognition, which is surrounded by the course learning communities. The instructional design and components then enclose the learning communities. These instructional design components include: a self-directed learning framework (acts as a scaffold for students), online learning tasks, reflection, interaction and engagement, continuous feedback, and integrated authentic learning. The process then gives way to the output portion of the system, which includes in this case, overall learning gain (content specific), final products, course evaluations, group effectiveness, course completion rates, and real world authentication. It is assumed that the model includes a feedback loop that continues to drive the overall learning system.

The model of social, self-direction has been under a constant iteration process. This research study is primarily focused on the resulting output of the model. The question and research guiding the current research study is as follows: What are the self-perceived learning gains of students engaged in a social, self-directed learning experience? A sub-question to this is: Do students improve their learning in objectives that are not specifically selected on self-designed individual/group learning contracts? The results of this research will impact the overall validity of the model and provide fodder for future research and model iteration.

The Instructional Context

The instructional intervention that was applied as part of this research project has been utilized in both web-based (75% or more time spent online) and hybrid course formats (a mixture of face-to-face and online experiences making up either a 40%-60% or 50%-50% split of time in either setting). Technology integration courses at both the Masters and Undergraduate level have been utilized for the described intervention. Student technology experience has quite varied ranging from beginner to expert levels.

As part of the course under investigation, students participated in a one-day face-to-face orientation in which the following elements were introduced: courseware program (Blackboard 6.0), learning patterns assessment, self-diagnostic instrument completed (pre-test), course material reviewed, expectations shared, groups formed, and learning contracts concepts presented. Rough drafts of the group learning contracts were developed prior to leaving the first class meeting.

Individual and group learning contracts were created based on the areas of learning "need" self-determined on the initial diagnostic instrument, which is patterned from Knowles (1986) needs assessment design. Next, the following components were identified during the learning contract process: strategies and resources that would be used to complete their work, dates for completion, evidential products that will demonstrate new knowledge, and authentication procedures to verify product content and quality. The learning contract process is graphically portrayed in Figure 2.

Students were also required to remain engaged through participation in the online discussion board activities and completion of student homepages. Weekly resources (offline content and online materials) were shared throughout the semester to provide students with a breadth of exposure to add to the depth of objective exploration that occurs as a process of the learning contract design. The diagnostic instrument, learning contract, course materials, and reflective instruments were utilized as scaffolds to structure and guide the experience despite the previous level of technological knowledge.

In order to facilitate the development and sustenance of the learning communities, which is primary to the model, students are asked to create at least three group objectives on the learning contract and another two individual objectives. Students can decide to complete all group objectives, but not all individual objectives. The use of group objective building process aims at reducing isolation, building community constructs, establishing team/community and personal learning, developing shared vision, and creating knowledge construction as has been deemed vital throughout the literature on learning communities and communities of

practice (Brown, 2001; Derry & DuRussel, 2000; Tu & Correy, 2002). Also evident in the proposed model and designed environment are elements of Wenger's (2000) modes of belonging: engagement, imagination, and alignment.

Methods

A design-based research methodology has been used for the overall model development to focus on the global perspective of this unique system of learning. Design based research has been found to be appropriate for model design and iteration in complex learning environments (Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003; Sloane & Gorard, 2003). The design-based research methods provide a means for macro analysis that is necessary to bridge multiple concepts in complex learning environments.

This particular phase of study utilized a non-experimental research design with a pre-post assessment of self-perceived level of learning and accomplishment as a result of the instructional design intervention. At the time of presentation there were eight sets of data with an additional three semesters of pilot study. The data collection involved a pre and post self-rated diagnostic instrument, which lists all of the course objectives and asks students to rate their current level of knowledge (pre), and the level of knowledge necessary to be successful in their anticipated profession role (pre-relevancy indicator). The output measure (post) self-rated diagnostic instrument was patterned exactly as the initial pre-assessment with the same competencies listed; however, the students are asked to rate their level of accomplishment as a result of the instructional experience. Students are not "graded" on this and submission of this instrument in no way affects course grades.

Learning contract portfolio documentation and a final course updates were used to validate the data gained from the self-rated diagnostic instruments. As part of the learning process students designed individual and group learning contracts and resulting products and authentication that show evidence of competence acquisition. These portfolios were reviewed using document analysis to further triangulate the post-test instrument data.

The final course update includes a final reflection posted on the asynchronous discussion board asking students to review their learning over the semester and to critically examine the experience.

Population

Two different sample groups were used in this investigation, but all would be considered adult learners ranging from age from 25-65. There were 87 females and 25 males in the sample. The sample group was compiled over eight separate applications of the course intervention with students over a period of 18 months and three different course titles. There was great diversity in student technology competence (course content area) at the outset of each section. Appropriate university approvals and subject consents were garnered for this research study, with students who preferred not to participate being removed from the sample.

The sample groups all utilized the same instructional strategies and formats with some distinction on final expectation, adapting to align with actual course objectives. The student participants' professional backgrounds were diverse with the majority of students coming from educational fields; however, some were from nursing, business, pharmacology, and information systems.

Results

Each instrument, pre and post, were analyzed separately for descriptive statistics. Student scores for the pre self-rating instrument were compiled across semesters with mean values run by question on the pre and post instruments. The pre and post assessment included 24 self-rated questions, in which students ranked their knowledge on the associated course objectives on a scale from 1 (no current knowledge) to 4 (high current knowledge). The pre-test question means ranged from 1.53 to 3.13. The n value for each question varied dependent upon student response and/or course alignment of questions (112-90). There was significant variance in the questions with answers ranging from a minimum rating of 1 and a maximum rating of 4 for most questions, which supports the starting diversity of technology levels. See Table 1 for a listing of the descriptive statistics by question.

The post assessment followed the same configuration as the pre assessment. Students rated the gained knowledge on the course objectives. Means ranged from 2.67 to 3.71 with an n for each question ranging from 90-112. There was less variance in the post scores, but a range of responses were still evident. A quarter of the questions received a minimum of a 2 rating and all questions received maximum ratings of 4. Table 1 provides a listing of the descriptive statistics for the post assessment. Student responses on gained knowledge were in no way used to establish grades and were submitted electronically with no "grade" assigned to this task.

The pre and post data were analyzed using a t-test on the question means of the pre-post differences to determine the significance of the differences. All questions demonstrated significant differences ($p<.001$) indicating that globally learning occurred on all course items. The t-scores range from 7.305 to 15.747. Table 2 provides information on the t-scores by question number with the respective degrees of freedom.

Students received feedback on the learning contract objectives they submitted as their evidence for learning that was predetermined at the beginning of the semester. Students were given detailed, extensive feedback on their initial submission based on a skill rubric that was shared at the outset of the semester and were then provided with the opportunity to improve product quality. Through this process, the self-designed authentic products satisfactorily

Table 1.*Descriptive Statistics on Pre-Test and Post-Test by Question*

	Pre					Post				
Question	N	Mean	Standard Deviation	Variance	Skewness	N	Mean	Standard Deviation	Variance	Skewness
A1	112	3.13	.65	.42	-.33	112	3.71	.47	.22	-1.22
A2	112	2.14	.85	.72	.35	112	3.2	.76	.57	-.60
A3	92	2.01	.78	.60	.55	92	2.93	.81	.66	-.52
A4	112	2.38	.92	.85	.07	111	3.64	.61	.38	-1.99
A5	110	2.17	.89	.79	.38	110	3.22	.82	.67	-.84
A6	91	1.79	.80	.63	.67	91	2.86	.91	.83	-.42
B1	92	1.73	.83	.68	.91	92	2.98	.78	.61	-.52
B2	92	1.85	.81	.66	.54	92	3.12	.78	.61	-.78
B3	91	2.16	.87	.76	.29	92	3.34	.72	.51	-.79
B4	91	2.14	.80	.63	-.13	91	3.36	.66	.43	-.55
C1	112	2.95	.79	.63	-.46	112	3.80	.42	.18	-1.91
C2	112	2.76	.75	.56	.04	112	3.58	.58	.34	-1.03
C3	92	2.53	.76	.58	-.04	92	3.64	.55	.30	-1.21
C4	91	2.66	.72	.52	.06	92	3.58	.56	.31	-.89
C5	112	2.55	.87	.75	.08	112	3.58	.67	.44	-1.70
D1	92	1.53	.70	.49	.95	92	3.20	.73	.53	-.67
D2	92	1.71	.76	.58	1.01	92	3.10	.77	.59	-.46
D3	92	1.88	.80	.63	.47	92	3.16	.75	.56	-.44
D4	111	2.65	.88	.78	-.28	112	3.57	.65	.43	-1.85
E1	92	2.89	.87	.76	-.09	92	3.68	.57	.33	-2.03
E2	92	1.79	.90	.80	.80	92	2.83	.98	.96	-.50
E3	91	1.57	.90	.80	1.53	90	2.67	.92	.85	-.16
E4	91	2.70	.92	.86	-.14	91	3.57	.63	.40	-1.47
E5	90	2.61	.87	.76	.12	91	3.58	.67	.45	-1.57

Table 2. *T-Test Scores by Question*

Question	T Statistic	Df	Number of students who selected this objective
A1	7.792	222	6
A2	9.810	222	59
A3	7.897	182	15
A4	11.948	221	76
A5	9.093	218	43
A6	8.391	180	30
B1	10.522	182	24
B2	10.825	182	16
B3	9.943	181	11
B4	11.256	180	8
C1	10.110	222	30
C2	9.169	222	16
C3	11.337	182	12
C4	9.639	181	8
C5	9.929	222	28
D1	15.747	182	41
D2	12.296	182	11
D3	11.280	182	31
D4	8.891	221	16
E1	7.305	182	29
E2	7.463	182	15
E3	8.094	179	11
E4	7.382	180	8
E5	8.430	179	9

** All questions exhibit significance at a p>.0001

met the designed objectives and demonstrated gained knowledge. Given that students had the option of actively improving their work based upon rubric feedback, few assignments across the multiple semesters received unsatisfactory evaluations. The significant results from the t-test pre-post means by question were validated through the document analysis of previous work products and instructor ratings.

Significance of achieved breadth of knowledge having been found, it was then necessary to investigate whether the selected objectives placed on the learning contract by students resulted in higher degree of learning. Growth was seen across all questions indicating diffused overall learning despite student concentration on selected objectives. See Table 2 for a breakdown of the number of students who selected each objective for the "depth" portion of the content. Not all students received perfect scores or a high level of learning based upon the objectives that were selected. However, the average growth on those objectives selected was 1.36, with a range of responses between a loss of a point to 3 points growth. The average growth on those objectives not selected was .94, with the range of responses including a loss of a point to 3 points of growth. While it would appear unusual for students to have selected a value indicative of a reduction in amount of knowledge gained, this does perhaps suggest that students might have misjudged their initial knowledge due to lack of understanding of terminology and basic technology skill. These data definitely suggest that perhaps students were not concerned about instructor "acceptance" and did indeed truly self-evaluate knowledge at both points in time.

Conclusion

The question of "Who's in charge?" was not posed in an attempt to remove the instructor role from the "dance" of learning; rather, the focus was on investigating whether learning did occur when the control of learning tasks were transferred to the students and student communities. Instructors play a critical role, within the model and instructional design of social, self-direction, via instructional design, student facilitation, content development, feedback/critical analysis, and evaluation. However, rather than the instructor guiding the process, the learner becomes the one guiding the "dance" direction, flow, meaning, and pace.

The model, which has been represented in the formula *(I+P+O=Ou)* is shown in Figure 1, and attempts to merge popular adult education, social learning, and constructivist philosophies and provide a systemic view of the learning process that incorporates what is known about higher education best practices into the online environment. Like all new models, further iteration, development and dimensional visualization will need to occur to generalize and replicate the system elements. However, this particular study was focused on understanding whether learning was occurring given the instructional intervention that was attempted in the online environment.

The data of the pre and post instruments indicate that indeed, students self-rated their knowledge gain as significant. All questions indicated significant learning of the objectives ($p<.001$), which is substantiated by the learning contract products. The gradient range of improvement for each of the question (from a 1-pre value to a 3-post value indicator OR from a 2-pre value to a 4-post value indicator) was different for each individual based upon the beginning level of need, the objectives that might have received greater "depth", and individual student mediating variables (such as time, available technology, etc.). It was possible that the high level of significance that was found included some "approval" seeking behaviors from the students involved in the study. . For instance, given the semesters worth of work and the knowledge of the ongoing research study, it is possible that the students rated themselves higher to "please" the instructor. This effect is somewhat diminished by the lack of feedback and encouragement on this document. Further, given that some individual scores showed negative values in objective growth makes this phenomenon somewhat unlikely. The instructor introduced the post test as a reflective assignment that will in no way affect grading and suggests that the instrument simply be used as a tool for creating a learning plan and reflecting on gained knowledge.

Each learning contract was evaluated by the instructor on pre-established rubrics and was show to either be initially acceptable or through an active learning process improved to demonstrate appropriate knowledge and skill growth. This process was used as a validation indicator to establish if the learning products supported the student self-perceived learning gains. Students did have evidential products that met instructor expectation in the areas that were selected as learning objectives for the course. This substantiates the self-perceived knowledge on only those areas that were included on the learning contract (depth of knowledge in choice areas) and cannot be used as evidence to validate the breadth of knowledge that was rated on the post instrument.

While depth of knowledge gained in the class was found to be significant for the areas selected on the learning contract, further analysis was necessary to determine if growth occurred across all areas to attend to the breadth of content that the course was slated to cover. The data indicate that there was higher average growth in

those areas that were selected on the learning contract. The increased knowledge gain, in areas where depth was obtained, was substantiated by student comments on final reflective updates.

The findings of this study provide support for the significant learning gains that are achieved when using this instructional intervention. The next step in this process will be the need to tie these learning gains to the much more meaningful dimension of outcomes that has not yet been visually designed. The outcomes element provides a way to conceptualize the impact of the individual student learning on others both internally and externally. Were there other valuable and meaningful learnings (outside of course content) that occurred as a result from the use of this model in the instructional design? Do students become more self-directed as a result of the process in this instructional design and model of social, self-direction? Are students better able to assume responsibility for their own learning and generalize this to other learning situations? Does the social, self-directed model increase leadership potential and enhance leadership characteristics?

In fact, a study has recently been conducted showing that this model increases the use of leadership characteristics such as the use of time management skills, organization skills, self-motivation skills, problem solving, and team/group facilitation skills (Boyer, 2004). However, little is known about whether these learned skills continue throughout further coursework given a return to traditionally designed courses, or whether students return to the "comfort" of becoming compliant learners. Further, longitudinal work is needed to determine whether participant comments about changes in their organizational environments and families due to this instructional intervention are indeed signs of significant external impact. In other words, does the instructional design of a social, self-directed environment transform not only the enrolled individuals, but those outside of the course who are touched by those who are involved in the intervention?

The results of the this study, provide additional support for the possibility of designing student-centered, community driven, self-directed, and meaningful environments in online settings that provide the opportunity for significant learning gains. Students can be responsible for personal growth without the mandates and structures that many who have been experimenting with online delivery have determined are necessary. In order to help students be successful in the more self-regulating environments scaffolds may need to be provided (depending upon their current level of development). Providing these scaffolds adheres to positive adult learning practice and is much more conducive and transforming than returning to the "comforts" and "traditions" of instructor –led, instructor-controlled delivery and design.

The dance of learning requires a couple, a partnership, a community, that can move together to transform perspectives and enhance knowledge acquisition. Providing students with the "lead" opportunity is oftentimes not appreciated and/or welcomed given previous training and enculturation. The model of social, self-directed learning is one that required full engagement, participation, and commitment. Some students express a longing for the "ease" of sitting in class for a number of hours being told what to do and how to do it. This perspective limits the personal investment, which has been necessary to be functional citizens in a knowledge society where the need to think, plan, learn, collaborate, and innovate is paramount. The linearity of the "traditional" process was much "easier and simpler"; however, the comp lexity and commitment that is derived from a systems model such as the one presented has the potential of altering perspectives, instilling personal freedom and responsibility, and extending the learning process to internal and external communities. The systems model of social, self-direction aims at meeting this transitional need as we transform from a populace of compliant thinkers to innovative, self-motivated, community members.

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Figure 1. Model of Social, Self-direction for online environments that includes input, process, output and feedback dimensions.

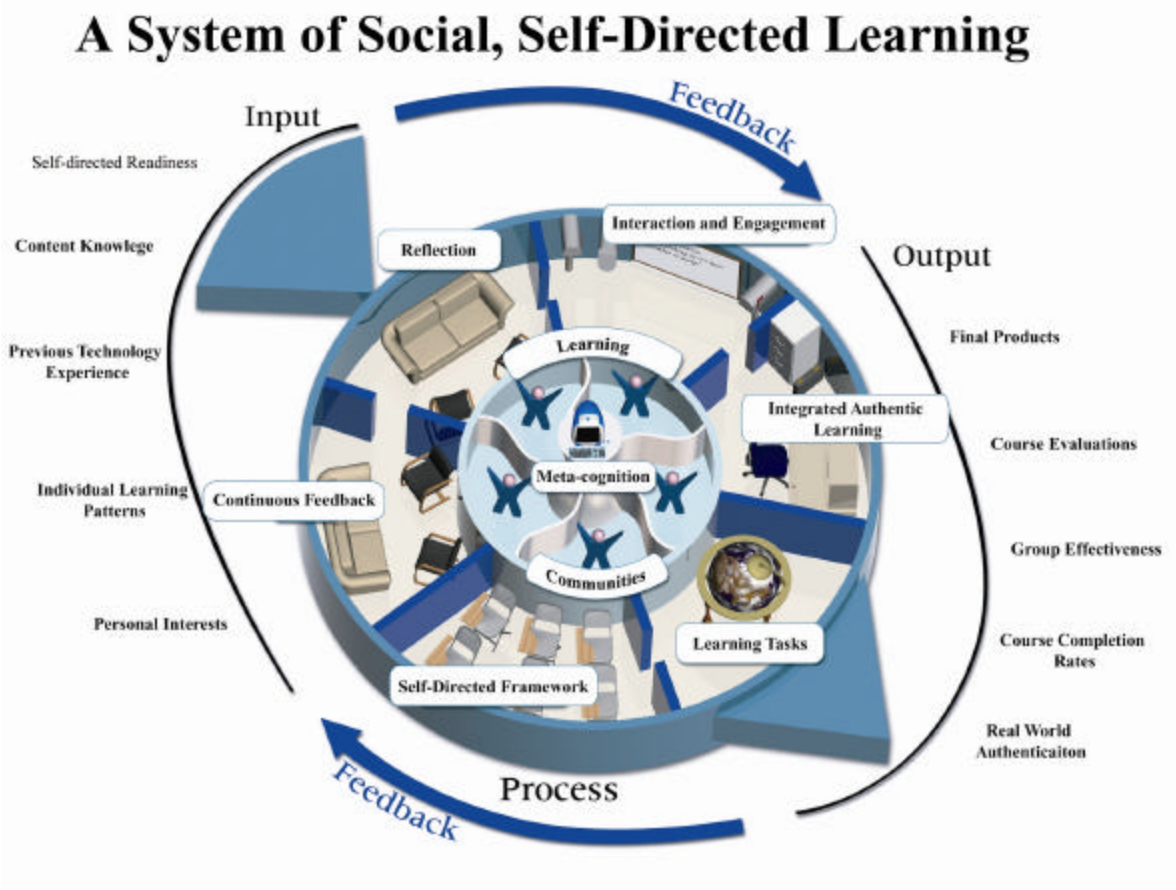

Figure 2. A Process for developing self-directed learning contracts to facilitate personal control of learning.