Missing Components in E-learning Designs: A Learning-to-Change Thesis and a Proposal for Design-Based Research

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Abstract: - Contemporary learning theories inform online teachers to (re)design the course to be more authentic, flexible, and most importantly, learner-centered. However, to have a real impact on the reality, still not much literature address *how*, and more importantly, *why*? A phenomenon we observed that unexpected emergence of systemic changes, or even transformation, seemed quite common at the level of a course and in the context of professional learning. Among these changes, learning to change in BOTH teaching and learning to achieve high quality learning (we called it a learning-to-change thesis) is possibly one of the most critical, which lack of research in the present literature. This study explored some possibilities of conducting design-based research for this thesis in the future studies.

Key-Words: - Learning to Change, Design-Based Research, E-learning Designs, Blended Learning

1 Introduction

The Internet-based learning platforms spread widely and swiftly across almost every campus. The predominant view of situated cognition in e-learning and its associated pedagogies such as distributed learning, open learning, learning communities, communities of practice, and knowledge building communities were all under heavy experimentation (Dabbagh, 2005). Education professionals have thus experienced tremendous pressures toward the transformation in instructional theory and practice.

We are moving from standard mode of transmission toward more authentic, flexible, and most importantly, learner-centered. Is this popular assertion a merely conception or a surely truth? It is believed by the author that a clear answer for this simple question lies just in between. A more meaningful question to ask may be how one can make this conception into a reality, and with an acceptable price. Design is the key (Reigeluth, 1999). In this regard, not only learning technology but also instructional strategies and pedagogical models should be re-designed to achieve a synergy (Dabbagh, 2005).

The authors have experimented new models of web-based, learner-centered teaching for several years. According to this experience, and those of many others appeared in the literature, emergence of systemic changes in BOTH teaching and learning seemed inevitable. For example, without un-freezing of old ways of teaching and learning and motivating for acquiring new skills of self-regulated learning, stakeholders in e-learning certainly will maintain their usual styles of thinking and behavioral routines to resist in climbing a stiffed learning curve. As a result, a distinct variation of learning outcomes, or a large proportion of less-then-desired results was often observed. We believed that failures to manage these emergent changes may jeopardize e-learning success for the professional. To overcome this inevitable resistance to change, conceptual frameworks and innovative measures should be devised. To respond to this challenge, this study explored some possibilities in support of effective changes.

2 Theoretical Backgrounds

Incorporating e-learning into our own practices of teaching in higher education is the context of this study. To effectively research on and within this innovative context, we re-examine our epistemological beliefs in theory of practice, conceptions about instructional-design theory, and causal mechanisms effecting systemic changes in teaching and learning.

2.1 Theory of Practice

Practical situations can be characterized as constantly changing, highly indeterminate, unstable, unique, conflicted in value, etc (Schön, 1983). Ackoff (1999) called such situations as messes. We often follow a technical rationality to simplify such messy situations by looking for the most effective means to achieve certain ends. Ackoff believed that this is the wrong approach.

Schön approached above messes by reflection-in-action (1983). Through constant dialogues with the present situation while acting, one may critically reflect upon unexamined and important assumptions embedded in actions and associated contexts. This may greatly inform a decision maker to re-frame a situation which can much easier to be resolved.

Practical knowledge is context-specific and consists of 'repertories of examples, images, understandings, and actions.' (*ibid*., p.138) Moreover, practical knowledge can also be generalized, for example, 'professional practice also includes an element of repetition. A professional practitioner is a specialist who encounters certain types of situations again and again.' (*ibid*., p.60.)

2.2 Design Theory

Van Aken (2004) distinguished design sciences from explanatory sciences. While applying the latter to describe, explain, or even predict the social phenomenon, we deploy the former to improve our practice. Claims involving actionable knowledge look like: 'In the situation Z, to achieve Y, take actions X.' Z, X, and Y are all theoretical constructs. X is a design or solution concept involving an action or process, a collective of actions or processes, etc. A design theory is actually a design exemplar or a set of guidelines providing insights for the practitioner to initiate their own actions. A re-design by following a design theory to suit their specific situation is thus required. In the domain of education, Reigeluth (1999) assembled a pool of instructional-design theories.

To improve practice in the situation of messes, Ackoff (1999) suggested an interactive planning process including an idealized design about the future state. With this design in mind, one may look back to the present situation to plan, take actions, and then adapt to any emergence in the new situations.

2.3 Generative Patterns

Kvernbekk (1999)considered practical knowledge as a kind of causal knowledge, linking outcomes with actions being taken. This definition places actions as the center of knowledge claims. He believed this actionable knowledge can be generalized, and is consistent with practitioners' orientation toward increasing likelihood of success, both in professional images and in business results, through knowledgeable actions.

Two main theories of causality can be differentiated, the succession theory and the generative theory. According to Pawson & Tilley (1997), realists believed that causal outcomes follow from mechanisms acting in contexts. Mechanisms are about people's choices and the capacities they derive from group membership. A mechanism is thus 'not a variable but an *account* of the make-up, behavior and interrelationships of those processes which are responsible for the regularity' observed in the social phenomenon (*ibid*., p.68). It is our estimation that the emergent systemic changes observed in complex learning situations, as stated in the beginning part of this paper, is such an account lacking research in the current literature.

Richter & Albert (2004) outlined a pattern-oriented research strategy for complex learning environments. They suggested to open up the black box to examine in more detail how e-learning works instead of merely asking if a certain educational approach works. This strategy serves not only the purpose of facilitating improvements in practice, but also the purpose of producing generalized knowledge. These two purposes are strongly interrelated in practice. With similar interests, we chose action research to conduct the empirical study.

3 The Empirical Study

We chose to do multiple rounds of action research on a course titled "Action Research." Students participated in this elected course are all in-service high school teachers. In the summer time, these students enrolled eight courses and all courses last for an eight weeks' period. Each course was

condensed into four-hour class time, i.e. two credit hours in equivalents.

The first author taught this course for the first time in 2003 (a snapshot of the class, see figure 1). At that time, he is an active researcher in the domain of case study research and e-learning. However, this is his first trial on teaching action research. While he is quite familiar with business professionals, this is his first contact with a student population such as education professionals. In addition, the un-familiar condensed course format and new e-learning platform all contribute toward messes. After that some what less-then desired initial attempt, the first author has continued his trials for two more times.

Figure 1: A snapshot of the class

3.1 Data Collection

Research data were collected throughout the whole course. Data resided on course website include forum, reflective learning journals, assignments, quiz, project reports, etc. In addition to that, we audio-taped and then transcribed the whole class sessions, including all lecturing and discussions in open public. We also administered questionnaires at time periods of pre-, mid-, and post-. All these data constitute a complete record of a case for further analysis.

3.2 Data Analysis

We adopted the analysis approach of pattern matching proposed by Yin (1994) and Richter & Albert (2004). We used data of the first and second rounds of action research as a baseline to outline two competing but equally plausible accounts explaining noticeable regularities in students' learning outcomes. Then, we applied a set of data from the third round of action research to test if they fit predicted patterns suggested by these two accounts.

4 Preliminary Findings

What we presented here are only preliminary results, mostly based on observations on site and readings in web site. We plan to elaborate further our research framework and do fine-grained analysis in the near future.

4.1 Evolution of Web-Based Pedagogical Designs

With previous reviewed theory of practice in mind, we emphasized reflective practice through both self-report and dialogues in action learning set meetings. We also requested that each student completes a term project to conduct his own action research. This course design laid a common foundation for all three trials. In addition to this basic design, variation in each implementation and emergence of systemic changes are listed in the following Table 1.

Table 1: Major Designs and Emergent Systemic Changes

Designs\ Trials	2003	2004	2006
Learning platforms	Open sourced, general purposed Content Management System (Xoops), located in a third-party server	Software is the same as 2003, but located on the first author's own server and with a new design of user interface	Moved to Moodle, an open sourced, social constructivism-based, course management system, located on the first author's own server
Authenticity	Moderate	Moderate	High
Flexibilit	Low	Mod	High

y		erate	
Learner-Centeredness	Low	Moderate	High
Role of Teacher	Subject expert, agenda setter,	Subject expert, resources provider, agenda setter,	Mentor, learning designer, goals setter, means (for effective learning) provider, developer of learning community
Role of Learners	Most are passive learner	Some are active learners but most are still rather passive	Aware, accept and adapt to a new role of active learner, become self-regulated learner
Teacher's Learning to Change	Presence of mentor, slow to none of change	Adept to new situations	Alignment in both theory and practice, being transformed
Learners' Learning to Change	Seldom to appear	Seldom or slow to appear	Most and fast to appear
Idealized Design Conceived in Final Report of Action Research Project	Almost none, awareness low	Almost none, awareness moderate	Some, awareness rather high

We may conclude from reading this list of emergent changes that teacher's and students' learning to change did contribute to desired learning outcomes. The focal teacher (the first author) took more time (over three years) to be transformed into a competent learning designer. The participating students experienced similar requirements of learning to change in all three rounds of action research. However, in the latter round, students' learning to overcome resistance to change is much effective and learning results desirable.

We believed that improving our teaching practice to lead professionals' learning to change is a never-ending process. In this regard, innovative measures based on e-learning platform to further improve the messy situation are under authors' construction right now.

4.2 Testing Alternative Accounts

We presented our premises in short as in Figure 2.

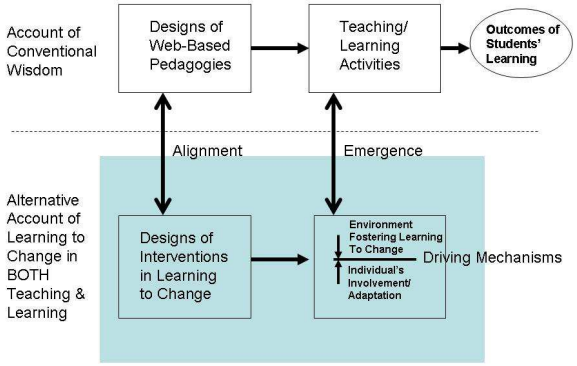

Figure 2: Alternative Accounts of Mechanisms Driving Toward Successful Outcomes

Our theses may be read as follows:

> Contemporary learning theories inform online teachers to (re)design the course to be more authentic, flexible, and most importantly, learner-centered. To realize this vision at the level of a course and in the context of professional learning, unexpected emergence of systemic changes, or even transformation, is quite common in practice. We believed that failures to manage these emergent changes may jeopardize e-learning success for the professional. Among these changes, learning to change in BOTH teaching and learning to achieve

high quality learning is possibly one of the most critical.

Constrained by limited pages available, we chose to present only the most convincing evidence to refute the account of conventional wisdom (see the upper part of Figure 2). While each round of action research had a blueprint of designs (website design and course syllabus) in mind, however, discrepancy results in terms of teaching and learning activities not in alignment with original designs and unexpected changes were witnessed in the first two rounds of studies.

Alternative account that can best described what happened and how they worked was illustrated in the bottom half of Figure 2. We believed that desirable learning outcomes can be achieved if the teacher aligns pedagogical designs with interventions on learning to change, and if the teacher plays important roles of community builder and mentor.

4.3 Evolving Designs of Interventions in Learning to Change

Over the years, the authors have evolved a complex set of designs useful to dealing with the requirement of constant changes in not just the teacher side, but more importantly, the student side. To be short, we promoted reflective practices in both teaching and learning to help resolve these issues.

Specifically, we applied an action theory of planned change. The teacher facilitated students to continuously dialogue with the situation of learning and urged critical reflection. For example, students kept a learning journal and wrote regularly, a reflection framework linking outcomes with actions was advised by the teacher, students should diagnose the problematic situation before took actions on, from multiple perspective and based on evidence, the deep structure underneath less-than-desired results, etc. More, a peer-supported group functioned well in a form of face-to-faced meeting where peers play the role of trustable mentor, and within online communities of practices.

In teacher's side, once we climbed over stiffed learning curve, then we conducted multiple rounds of design experiments, through continuing dialogue with situation of practice, and with the extant literature.

5 Conclusions

Toward enhanced professional learning via e-learning is not only a fast growing business but also a real challenge attracting much attention from professional students, faculty members in higher education, and most importantly the school administration. Based on our own experiences in conducting a series of action research and field experiments, we present a learning-to-change thesis and convincing evidence to complement conventional wisdom of web-based pedagogical designs. We hope that this thesis may shed some lights to account for less-then-desired results often reported in the literature. Thorough analysis of the phenomenon and more rigorous testing of the thesis are needed in the future studies.

References:

[1] Ackoff, R.L., *Re-Creating the Corporation: A Design of Organizations for the 21st Century*, Oxford University Press, Inc., 1999.

[2] Biggs, J., Kember, D., and Leung, D.Y.P., "The Revised Two-Factor Study Process Questionnaire: R-SPQ-2F," *British Journal of Educational Psychology*, Vol.71, 2001, pp.133-149.

[3] Dabbagh, N., "Padagogical Models for E-Learning: A Theory-Based Design Framework," *International Journal of Technology in Teaching and Learning*, Vol.1, No.1, 2005, pp.25-44.

[4] Derntl, M. and Motschnig-Pitrik, R., "BLESS – A Layered Blended Learning Systems Structure," *Proceedings of I-KNOW '04*, Graz, Austria, June 30 – July 2, 2004.

[5] Kvernberkk, T., "Knowledge that Works in Practice," *Scandinavian Journal of Educational Research*, Vol.43, No.2, 1999, pp.111-130.

[6] Lizzio, A. and Wilson, K., "Action Learning in Higher Education: An Investigation of Its Potential to Develop Professional Capability," *Studies in Higher Education*, Vol.29, No.4, August 2004, pp.469-488..

[7] Pawan, F., Paulus, T.M., Yalcin, S., and Chang, C.-F., "Online Learning: Patterns of Engagement and Interaction Among In-service Teachers," *Language Learning & Technology*, Vol.7, No.3, September 2003, pp.119-140.

[8] Pawson, R. and Tilley, N., *Realistic Evaluation*, Sage Pub., 1997.

[9] Reigeluth, C.M., (ed.), *Instructional-Design Theories and Models: A New Paradigm of Instructional Theory, Volume II*, Lawrence Erlbaum Associates, 1999.

[10] Richter, C. and Allert, H., "Outline of a Pattern-Oriented Research Strategy for Complex Learning Scenarios," *International Conference of*

the Learning Sciences ICLS 6/2004, Lawrence Erlbaum Associates, available on-line.

[11] Schön, D.A., *The Reflective Practitioner*, Basic Books, Inc., 1983.

[12] Van Aken, J.E., "Management Research as a Design Science: Articulating the Research Products of Mode 2 Knowledge Production in Management," *British Journal of Management*, Vol.16, 2005, pp.19-36.

[13] Vat, K.H., "Developing a Learning Organization Model for Problem-Based Learning: The Emergent Lesson of Education from the IT Trenches," *Journal of Cases on Information Technology*, Vol.8, No.2, April-June 2006, pp.82-109.

[14] Yin, R.K., *Case Study Research*, 2nd ed., 1994, Sage Pub.