THE *GLOBAL VILLAGE PLAYGROUND*: A QUALITATIVE CASE STUDY OF DESIGNING AN ALTERNATE REALITY GAME AS A CAPSTONE LEARNING EXPERIENCE

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Abstract

The *Global Village Playground* (*GVP*) was a capstone learning experience designed to address institutional assessment needs while providing an integrated, contextualized, and authentic learning experience for students. In the *GVP*, students work on simulated and real-world problems as a design team tasked with developing an alternate reality game that makes an impact on the United Nations Millennium Development Goals. This session presents the results of a qualitative case study of the pilot implementation of this capstone design, a study focused on participant reactions to the course, their perceptions of the instructional design methodology, the ways they learned in the course, and the challenges they experienced during it.

Background

Developing the means to assess the overarching goals of a general education curriculum and aligning such assessments with those goals is a complex task, particularly in an educational climate conditioned to rely on assessment test-scores, grade-point-averages, institution ratings, and other numerically quantified scores of completer success. Indeed, a recent AAC&U sponsored survey found that employers are dissatisfied with such measures, calling instead for “faculty-evaluated internships and community-learning experiences” as well as “essay tests, electronic portfolios of student work, and comprehensive senior projects” (Hart Research Associates, 2008).

Tasked with developing a means to assess the state level outcomes for the general education curriculum, a large, urban, community college chose an electronic portfolio to serve this purpose. The use of portfolios to assess student learning that results from engagement in courses as well as entire programs of study has become a popular approach (Barrett, 2007; Juniewicz, 2003; Pullman, 2002). However, while portfolios might be preferable to standardized test scores, they don’t necessarily provide means for students to develop “real-world skills” as well as demonstrable products of performance in problem-solving and readiness for the workplace. Research has shown that for a portfolio assessment to be effective, the means by which it is implemented must provide scaffolding and

feedback to learners throughout the portfolio creation process (Segers, Gijbels, & Thurlings, 2008; Van Tartwijk, Driessen, Van Der Vleuten, & Stokking, 2007).

The *Global Village Playground* (*GVP*) was a capstone learning experience designed to address institutional assessment needs while providing an integrated, contextualized, and authentic learning experience for students. The *GVP* is an interdisciplinary learning community in which students work as a team tasked with developing an alternate reality game (ARG) that makes an impact on the United Nations Millennium Development Goals. This design project simulates a real-world work scenario in which students collaborate to create a deliverable product that meets the specifications of a client agency. The scenario compels students to engage with global issues and devise solutions collaboratively, communicate effectively in small and large groups, and manage a project timeline.

Purpose of the Study

The underlying premise of the GVP as an instructional design was that immersing students nearing program completion in a large-scale, collaborative design project as a capstone experience would have a perceived impact on their attainment of the overarching learning goals of the general education curriculum. Although the GVP was designed to provide a means to evaluate the program as a whole, this study focused specifically on evaluating the design of the GVP as a capstone learning experience, the effectiveness of the problem-based instructional methods, and the tensions that arise from implementing them. More specifically, this study addresses the following research questions:

1. What were student and instructor reactions to the course/course design?
2. What aspects of the design were most conducive to student learning?
3. To what extent did the course promote attainment of the overarching program objectives and/or advance conceptual age thinking?
4. What challenges or tensions arose from the design?

While this study was not intended as an evaluation of the entire program, the research questions were shaped by Kirkpatrick's (1994) four levels of evaluation, which represent a sequence of ways to assess the effectiveness of instructional programs: Reaction, Learning, Behavior, and Results.

Theoretical Framework

The recent surge of interest in digital games and simulations for learning stems in part from their ability to situate learning in contexts that represent reality such that knowledge gained in the digital environment can be cognitively transferred to real situations (Aldrich, 2003, 2007; Heinich, Molenda, Russell, & Smaldino, 1999; Pearce, 1997). For immersive games and simulations, this value stems in part from their ability to situate learning in contexts that better reflect the

real world and to immerse players in challenging learning experiences. According to Lave and Wenger (1991) and Bransford et al (2003), situating learning in relevant environmental contexts can provide learners with cognitive scaffolds that are expected to increase levels of learning, engagement, and transfer to future work. Methods that anchor instruction to meaningful and authentic contexts have been found to better allow learners to understand and transfer complex concepts than instructional methods which neglect to convey how, when, and where a concept can be applied in future situations that the learner might encounter (Cognition and Technology Group at Vanderbilt, 1990, 1993). Such methods are also thought to immerse learners in a community of practice, wherein they perform the roles of a practitioner rather than a learner—functioning, for example, as a scientist rather than a student in order to solve scientific problems, as opposed to the often decontextualized student challenges of completing an assignment or passing a test (Brush & Saye, 2001). Indeed, technological advances in computer-generated media have allowed the creation of immersive virtual environments that graphically represent reality more closely than ever and to pre-program these environments for almost instantaneous feedback based on parameters observed in reality. This learning affordance (Gibson, 1977) allows users to manipulate variables, adjust their actions or behaviors, and experiment with various processes or procedures.

Alternate Reality Games

A fairly new genre of game, the Alternate Reality Game or ARG, distributes game challenges, tasks, and rewards across a variety of media, both digital and real. As described by the International Game Developers Association (Adam Martin & Tom Chatfield, 2006), “Alternate Reality Games take the substance of everyday life and weave it into narratives that layer additional meaning, depth, and interaction upon the real world” (p. 6). CNET staff writer, John Borland (2005), depicts them as “an obsession-inspiring genre that blends real-life treasure hunting, interactive storytelling, video games and online community” (para. 4). Thus, an ARG provides players with an immersive digital experience that arguably better simulates the reality of information distribution (Baudrillard, 1994) than closed system games modeled on discrete parameters for the purpose of focused instructional goals. This is not to say that such media are unworthy as instructional products, but merely to point out that ARGs simulate information distribution and the skills necessary to seek, locate and evaluate that information in a highly meaningful way. Controlled by the narrative storyline, players are given new clues and directed to increasingly complex puzzles as the game progresses. Moreover, these games compel players to seek resources in a variety of places, evaluate the relevance of those resources, and apply them to solving the task at hand. Such skills are invaluable in a knowledge-based and information-saturated workplace, which requires not only the ability to find information, but also to evaluate its validity, authority, and applicability (Peter D. Hart Research Associates, 2008).

Although the ARG as a game genre has emerged quite recently, web sites like *unfiction.com* and *ARGNet* have links to several past and current ARGs,

such as *Cathy's Book* and *iamtryingtobelieve.com.* Some ARGs have served a marketing function, such as *ilovebees.com* that supported the release of Microsoft's *Halo 2* video game. Others have an educational focus; *Hexagon Challenge* and *Never Rest Game* are billed as instructional ARGs and claim to "address decision-making skills, after-action report generation, and adaptation to performance" (Bogost, 2007). Yet others, while not explicitly educational, deal with social, economic, or environmental justice and aim "to change the way people think, and feel, and live" (Strickland, 2007). Jane McGonigal, who masterminds ARGs for their capacity to construct "collective intelligence," maintains that the purpose of her 2007 ARG, *World Without Oil,* was to "play our way to a set of ideas about how to manage that crisis [a dramatic decrease in oil availability]" (cited in Strickland, 2007, p. 1). McGonigal observed that players not only generated strategies for coping with a peak oil crisis, they also changed their real world behavior: planting trees or converting their cars to run on biodiesel (Strickland, 2007). Thus, the simulated problem presented through the ARG yielded practical solutions and prompted real world applications of the knowledge constructed in the simulated play space.

Given the complications of developing fully integrated, stand-alone simulation or game worlds that include both the instructional content and the requisite scaffolds to facilitate learning (Scott J. Warren & Dondlinger, 2007; S. J. Warren & Dondlinger, In Press), harnessing media with intuitive usability to distribute these elements across the internet provides a welcome alternative. Such an approach maximizes resources, such as MySpace, web logs, podcasts, specifically developed web sites, YouTube, and immersive spaces such as the digital environment *Second Life*. By leveraging products that learners use as part of their daily lives, instructional design requires little technical proficiency and minimal expense to financially strapped students, instructors, and educational institutions at any level.

Furthermore, recent research on the use of *The Door* ARG to transform a large enrollment class at a university in Texas met with favorable results including statistically significant gains on posttest achievement when compared with existing computer aided instruction ($t(63)=3.898$, $p=.0001$) (Scott J. Warren & Dondlinger, 2008). Perhaps more significant, however, was the sense of power that students reported to have gained from their experience with *The Door* ARG. Although they reported a great deal of frustration with this learner-directed instructional design, they also marveled at how much they learned, particularly the resourcefulness to seek out answers and solutions to problems since neither were served up to them via the closed-system learning management system (LMS) to which they were accustomed or from the instructor who consistently redirected them to their peers and to other resources for answers to their questions.

Learning by Designing

Despite its success in terms of empowering learners to be full participants in their learning experiences, *The Door* ARG as a course redesign project was created by instructional design faculty and revised based on student feedback.

Indeed, the most common approach to creating educational games is to *design for* learners to play by including imposed instructional goals that result from professional analysis (Dondlinger, 2007). However, data from a recent national survey strongly argues for a different approach. A study initiated by the American Association of Colleges & Universities indicates that employers are dissatisfied with assessment test-scores, grade-point-averages, institution ratings, and other numerically quantified scores of completer success. Instead, they call for "faculty-evaluated internships and community-learning experiences" as well as "essay tests, electronic portfolios of student work, and comprehensive senior projects" which provide means for students to develop "real-world skills" as well as demonstrable products of student performance in problem-solving and readiness for the workplace (Peter D. Hart Research Associates, 2008, p. 1). Thus, the focus of instruction needs to become one that allows large-scale problem solving and compels a deliverable product that can then be evaluated by agencies outside of academia. Furthermore, the recent book, *A Whole New Mind*, compellingly argues that success in "The Conceptual Age" requires creative or artistic thinking.

> The past few decades have belonged to a certain kind of person with a certain kind of mind—computer programmers who could crank code, lawyers who could craft contracts, MBAs who could crunch numbers. But the keys to the kingdom are changing hands. The future belongs to a very different kind of person with a very different kind of mind—creators and empathizers, pattern recognizers, and meaning makers. These people—artists, inventors, designers, storytellers, caregivers, consolers, big picture thinkers—will now reap society's richest rewards. (Pink, 2006, p. 1)

Thus, creating a problem-solving experience wherein students engage in the process of *designing* is a potential means to foster this way of thinking.

Research Design & Methods

The research design followed a qualitative case study approach, which investigates "a contemporary *phenomenon* within its real-life *context* especially when the *boundaries* between the phenomenon and context are not clearly evident" (Yin, 2003, p. 13). In this case, the *phenomenon* was student perceptions of their learning experiences within the *context* of the pilot implementation of the GVP.

Participants & Setting

The setting for this research study was a sixteen-week course at a large, urban, community college in the southwestern United States. The course was an integrated, learning community experience wherein students elected to enroll for credit in two of four possible disciplines: speech, literature, humanities, or composition. The course design blended face-to-face class meetings with online learning and communication tools, in keeping with current practices in a global workplace wherein problems are solved and projects are developed across

expansive geographical distances via various digital telecommunications media. Participants included all students who completed the course, as well as the two instructors who taught the course.

Data Collection

The primary method of collection was semi-structured interviews conducted with students and instructors near the end of the implementation. In addition to the interviews, course documents, student posts and responses in online discussion boards and web logs were also collected. These forms of data documented students' active involvement in the learning activities of the GVP but did not necessarily elicit their perceptions of those activities. As such, these data sources served to triangulate the interview data, and provided further grounding for assertions made about student perceptions.

Data Analysis

In order to systematically analyze this data, a constant-comparison approach to interpretation was taken by the research team (Glaser & Strauss, 1967; Strauss & Corbin, 1998). In this study, analysis of the data included coding the transcripts of interviews all six students and the two instructors who participated in the course. Although identification of codes and categories was guided by the "themes" or levels of evaluation (Kirkpatrick, 1994) that shaped the research questions, the researchers worked in concert to identify emergent codes and categories within each theme and to construct a mutual understanding of the text, themes, categories, and codes. Emergent codes were constantly compared to previously identified codes, collapsed into categories representative of their similarities, and refined as additional codes and categories emerged. This process prompted further refinement of the themes as well. All phases of the coding were completed by three researchers. Disagreements in the assignment of codes were discussed until consensus was achieved among the three researchers.

Results

After segmenting the data into the four themes, the researchers coded each theme line by line, continuing to compare the data with the codes, generating additional codes, and refining the code and category labels. A total of 1107 passages and 35,410 words comprised of 191,693 characters were coded, yielding 27 categories and 157 unique codes. In order to determine how much of the text each category represents, both the percentage of characters and the percentage of passages for each category were calculated and averaged. While the percentage of characters gives a fair depiction of how much of the entire text each category represents, it does not account for how often a category or code occurs within the text. Conversely, however, calculating only the percentage of occurrences—or passages—does not account for how much text comprises each category and code. Some codes, for example, occur repeatedly throughout the

text, but responses are brief. So that the reader might distinguish among the labels for codes, categories, and themes more easily, *codes* are italicized, **categories** are bolded, and ***themes*** are bolded and italicized.

Description Of Themes

Analysis of the interview transcripts was shaped in part by the research questions, which were shaped in turn by the overall purpose of evaluation research. The preliminary "themes" to be explored in this evaluation study parallel the four levels of evaluation that Kirkpatrick (1994) describes in *Evaluating Training Programs*: reaction, learning, behavior, and results. The first theme in this analysis, ***Reaction***, includes categories and codes that pertain to students' reactions to various aspects of the GVP, such as the instructional design, the hybrid format of the course, use of technology, the learning environment created by the instructors, and their interactions with other students. The ***Learning*** theme shifts away from Kirkpatrick's level somewhat. Rather than providing evidence of *what* or *how much* learning occurred, this theme captures *how* learning occurred in the course: what motivated students to learn, what learning preferences students possessed, what role the content presented in the course played in students' learning, and what impact the game design scenario had on their learning. The behavior level of evaluation assesses the extent to which participants change how they perform as a result of participating in a given training program. In this study, it was not possible to examine changes in learner behavior after completion of the course, nor was it part of the overall purpose of evaluating a pilot implementation, which was focused on collecting and interpreting data to inform refinements of the design prior to further implementation. Instead, this theme assembles evidence in student interviews that suggest changes in thinking, values, attitudes, and behaviors as a result of their experiences in the GVP. The research team labeled this theme ***Transfer***, a label which better captures the codes and categories of text in this theme which provide evidence that students, in their self-reports during interviews, have to some degree internalized the values, attitudes, and patterns of thinking, such that those intended outcomes might govern their behavior or performance in the future. The final level, ***Results***, attempts to determine the wider impact that a training program has on an organization, which is often difficult to evaluate. In the case of the GVP, this level or theme specifically identifies what worked well and what didn't, the tensions and successes that occurred in this semester-long implementation.

A total of 157 codes were assigned to 27 categories within the four themes of analysis. The seven categories in the ***Reaction*** theme account for the smallest portion of the total coded text (12.5 %) while the eight categories in the ***Learning*** theme account for the most (35.8%). Figure 1 visually represents the magnitude of each portion of the overall text captured by each theme and similarly displays the weights of the categories that comprise them.

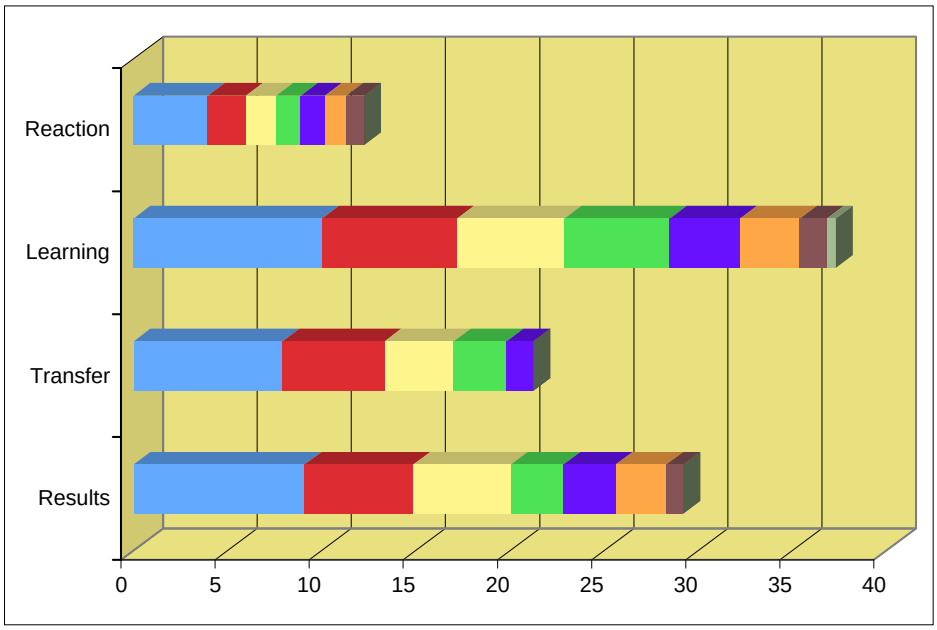

Figure 1. Composition of themes.

The ***Results*** theme contained the most codes, more than twice the number of codes in the ***Reaction*** and ***Transfer*** themes, in large part because the researchers identified separate codes related to tensions and successes within each category. Table 1 presents the P/C Mean percentage for each theme, along with those of the categories within each. It also presents the P/C Means of each category relative to its respective theme, as opposed to the overall text.

Table 1. Passage/character mean weights for themes and categories

Theme	Categories	# Codes	P/C Mean % of Theme	P/C Mean % of Total Text
Reaction	**Instructional Design**	6	32.86	3.96
	Instructors/Learning Envir.	3	16.31	2.02
	Overall Reaction	3	12.52	1.60
	Technology	3	10.88	1.32
	Prior Experience	4	10.25	1.27
	Hybrid/ALCE	3	9.42	1.14
	Peers/Students	3	7.76	0.96
	Theme Totals	**25**	**100.00**	**12.27**
Learning	**Self-Reflection**	7	26.84	10.02
	Teamwork	6	19.26	7.17
	The Game	7	15.25	5.70
	Prior Knowledge	3	14.97	5.59
	Course Content	7	10.05	3.76
	Technology	4	8.50	3.17
	Motivation	5	3.88	1.45
	Instructors	3	1.25	0.46
	Theme Totals	**42**	**100.00**	**37.31**
Transfer	**Knowledge Construction**	5	37.41	7.90
	Respect for Others	6	25.64	5.43
	Individual Values	7	17.06	3.67
	Open-mindedness	4	13.06	2.79
	Social Responsibility	4	6.83	1.43
	Theme Totals	**26**	**100.00**	**21.23**
Results	**Instructional Methods**	15	31.16	9.10
	Students	13	19.85	5.79
	Curric. & Assessment	10	17.62	5.15
	Technology	7	9.61	2.80
	Epistemology	7	9.54	2.78
	Course Format	8	9.16	2.69
	Institution	4	3.06	0.90
	Theme Totals	**64**	**100.00**	**29.19**
Text Totals	**27**	**157**		

More detailed descriptions of each of the themes, including the categories within them and the codes that make up each of the categories follow.

Reaction Theme

Based on the P/C Mean percentage, the ***Reaction*** theme represents the smallest portion of the total text, 12.5%. The categories and codes that underpin them paint a picture of students' reactions to various aspects of their experiences in GVP, including elements of the problem-based instructional design, the hybrid or blended format of the course, the learning environment created by the instructors, and their interactions with other students. Figure 2 shows the P/C Mean percentage of each category within this theme, as opposed to its percentage of the entire text.

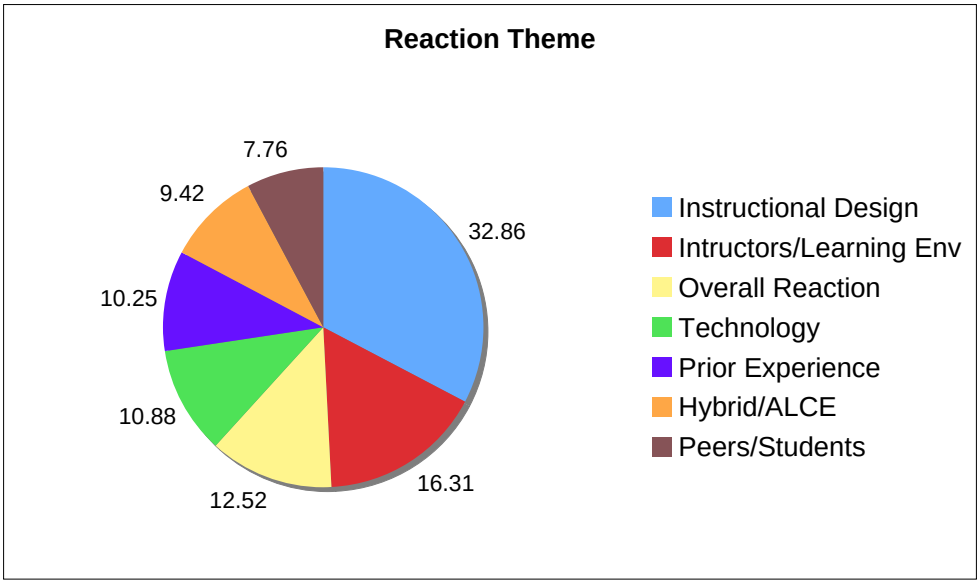

Figure 2. P/C mean percentage of text in Reaction theme by category.

Of the seven categories, **Instructional Design** was by far the largest, representing almost a third of the text in this theme. The **Learning Environment** fostered by the instructors was also a significant category of students' reaction to the course, representing over 16% of this theme. Data capturing students' **Overall Reaction** was the third strongest category, while **Technology**, **Prior Experience**, and the **Hybrid** and learning community (**ALCE**) formats of the course were roughly equal at about 10% each. Table 2 displays the categories and codes, as well as their respective weights within this theme and the entire text.

Table 2. Passage/character mean weights for categories and codes in Reaction theme

Categories	Codes		P/C Mean % of Category	P/C Mean % of Theme	P/C Mean % of Total Text
Instructional Design	*Activities/Tasks*		23.16	7.56	0.91
	Course Sequence		16.63	5.69	0.65
	Course Structure/Flow		16.10	5.31	0.63
	Teamwork/Comm		15.14	4.87	0.60
	Connections among tasks		15.02	4.91	0.59
	Game Scenario		13.95	4.52	0.55
Totals		**6**	**100.00**	**32.86**	**3.93**
Instructors/ Learning Environment	*Positive Energy/ Encouragement*		52.92	8.62	1.06
	Open-ness of Course		29.15	4.76	0.59
	Professional Atmosphere		17.93	2.93	0.36
Totals		**3**	**100.00**	**16.31**	**2.00**
Overall Reaction	*Enjoyable/Fun*		51.13	6.43	0.82
	Frustrating		28.85	3.58	0.45
	Engaging/Challenging		20.02	2.50	0.32
Totals		**3**	**100.00**	**12.52**	**1.59**
Technology	*Usefulness*		70.94	7.77	0.92
	Comfort/familiarity		15.73	1.65	0.22
	Too many technologies		13.33	1.45	0.17
Totals		**3**	**100.00**	**10.88**	**1.31**
Prior Experience	*Other Classes*		40.28	4.10	0.49
	Preconceptions w/ course		28.08	2.85	0.34
	Technology		22.04	2.31	0.30
	Life		9.60	1.00	0.13
Totals		**4**	**100.00**	**10.25**	**1.26**
Hybrid/ALCE	*F2F once/week*		63.11	5.96	0.71
	6-hr Course		19.60	1.81	0.22
	Multi-disciplinary		17.29	1.65	0.19
Totals		**3**	**100.00**	**9.42**	**1.13**
Peers/Students	*Working Relationships*		57.70	4.46	0.54
	Frustrations		23.62	1.83	0.22
	Friendship		18.69	1.48	0.19
Totals		**3**	**100.00**	**7.76**	**0.96**
Theme Totals		**25**			
Text Totals		**157**			

Overall, students reacted favorably to the GVP. They found the course activities, predominantly student presentations, team projects and class discussions, to be effective ways to learn. They also found their experience to be "enjoyable," particularly the "open" and "safe" learning environment fostered by the instructors. They seemed to prefer learning in this way when compared with traditional methods of instruction, findings in keeping with scholarship on student engagement (Chickering & Gamson, 1987; Chickering & Gamson, 1991; Koljatic & Kuh, 2001; Kuh, Pace, & Vesper, 1997). They also enjoyed learning with technology. However, they reacted more favorably to the technology in the

classroom than the hybrid design. They enjoyed the communication tools that allowed them to keep in touch outside of class, but did not like learning on their own at a distance as much as face-to-face contact. This conclusion, too, aligns with prior research on student engagement, particularly the literature on satisfaction and engagement with distance learning environments (Conrad, 2002; Hassenplug & Harnish, 1998).

Learning Theme

The ***Learning*** theme represents the largest segment of the total text, 37.31%. This theme includes seven categories comprised of 42 unique codes, and 406 passages made up of 76,332 characters of text. The categories and codes in this theme reveal students' perceptions of *how* learning occurred in the GVP, whether it was through presentation of content by instructors, the use of technology, or through the central problem scenario, designing an ARG. This theme also identifies what motivated students to learn, what learning preferences students possessed, and what role knowledge gained prior to this course played in students' learning. Figure 3 below shows the P/C mean percentage of each category within this theme.

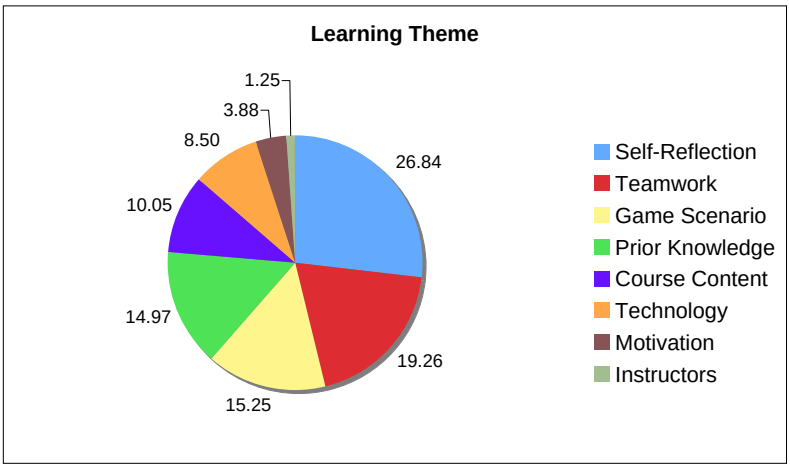

Figure 3. P/C mean percentage of text in Learning theme by category.

Of the eight categories, **Self-Reflection** was by far the largest, representing almost 27% of the text in this theme. Indeed, **Self-Reflection** is the largest category in the entire text (10.02% of total text), comprising almost as much text as the whole ***Reaction*** theme (12.27%). **Teamwork** was also a strong category in this theme. While it represents fewer characters of text than the **Game Scenario** (12,669 and 13,132 respectively), it had far more occurrences in the text (89 and 54 respectively) giving **Teamwork** a higher P/C mean weight (7.17% of total text) than student references to the **Game Scenario** (5.70%). **Prior Knowledge** weighed in very closely behind the **Game Scenario** category. In fact, it seems from these figures to have been more important than the **Course Content**, a finding that I consider a success of the design for reasons that I will discuss later. The data suggests that **Technology**, **Motivation**, and **Instructors** played a less significant role in this theme with a combined weight (13.63) less

than that of **Prior Knowledge** alone. Table 3 displays the categories and codes, as well as their respective weights within this theme and the entire text.

Table 3. Passage/character mean weights for categories and codes in Learning theme

Categories	Codes		% of Category	% of Theme	% of Total Text
Self-Reflection	*Peer Interaction*		21.05	5.61	2.08
	Personal Interests/Values		18.07	4.84	1.80
	Self-Awareness		15.80	4.23	1.57
	Self-Regulation		15.35	4.14	1.55
	Learning Preferences		14.59	3.90	1.45
	Self-Evaluation/Assessment		12.46	3.35	1.25
	Inst-Student Interaction		2.66	0.71	0.26
Totals		**7**	**100.00**	**26.78**	**9.95**
Teamwork	*Participation/Roles*		26.65	5.15	1.91
	Communication/Discussion		24.95	4.81	1.78
	Strategies/Processes		16.70	3.20	1.19
	Frustrations		14.24	2.82	1.04
	Common Interests/Goals		11.01	2.16	0.80
	Interdependence		6.44	1.19	0.44
Totals		**6**	**100.00**	**19.33**	**7.17**
Game Scenario	*Applying & Integrating Knowledge*		47.86	7.32	2.72
	Developing Narrative/Art		18.26	2.84	1.06
	Health Issues		14.52	2.26	0.84
	Global Awareness		9.03	1.35	0.50
	Self-Efficacy		4.98	0.76	0.28
	UN MDGs		3.26	0.49	0.18
	Environmental Issues		2.09	0.33	0.12
Totals		**7**	**100.00**	**15.34**	**5.71**
Prior Knowledge	*Other Classes*		58.76	8.77	3.26
	Prior Life Experience		31.27	4.67	1.74
	Reading/Media		9.97	1.49	0.56
Totals		**3**	**100.00**	**14.93**	**5.55**
Course Content	*Other Cultures*		38.05	3.84	1.43
	Architecture/Art		28.63	2.89	1.08
	Multiple Disciplines		13.06	1.28	0.47
	Research/Documentation		8.62	0.87	0.32
	Writing/Grammar		6.61	0.65	0.24
	Archetypes/Symbols		2.74	0.28	0.10
	Literature		2.29	0.23	0.08
Totals		**7**	**100.00**	**10.03**	**3.73**
Technology	*Tools*		38.06	3.26	1.21
	Apply/Use in Other Contexts		24.51	2.07	0.77
	Clearer Communication		20.30	1.71	0.63
	Active InvolvementInteraction		17.13	1.44	0.54
Totals		**4**	**100.00**	**8.48**	**3.15**
Motivation	*Relevance/Connections to Life*		31.78	1.23	0.46
	Personal Interests/Goals		25.24	0.99	0.37
	Grades		20.69	0.79	0.29
	Doing Well		12.91	0.51	0.19
	Reliability/Interdependence		9.38	0.36	0.13
Totals		**5**	**100.00**	**3.87**	**1.44**
Instructors	*Support Outside of Class*		35.29	0.43	0.16
	Focusing Discussions		34.19	0.42	0.16
	Straightforward Instruction		30.52	0.39	0.14
Totals		**3**	**100.00**	**1.24**	**0.46**
Theme Totals		**42**			
Text Totals		**157**			

This particular group of students was very self-reflective. Both the nature of the course, which engaged them with big questions, and the open-ness of the learning environment seemed to foster this reflective vein. They reflected most on how well they learned from peers through discussions in class led by both instructors and students, a promising finding with respect to constructivist learning environments (Duffy & Cunningham, 1996; Jonassen, 1999). Students gave as many if not more presentations to the class than the instructors, particularly in the early part of the class. Their personal interests were given voice in such a multi-disciplinary class, and when they were able to find common ground with their peers, they seemed particularly successful. They also seemed to acquire an appreciation for differing perspectives and located the source of their own developing conceptions, perspectives, and views as this peer interaction. Although relying on peers to contribute to team tasks presented frustrations, students learned some strategies for coping with those frustrations, and saw how their own self-discipline was important when others were relying on them. They were most motivated by the relevance of the learning tasks, a finding that aligns with prior research on problem-based learning, particularly the recent research on The Door, problem-based ARG (Warren, Dondlinger, & McLeod, 2008). They were also highly motivated by personal interests and goals, which is closely connected to relevance in that one relates most easily to those things relevant to his or her personal interests.

Transfer Theme

The ***Transfer*** theme assembles evidence from student interviews that suggests that they have to some degree internalized the values, attitudes, and patterns of thinking that were the overarching goals of the design: the core perspectives and conceptual age thinking. The ***Transfer*** theme represents 21.23% of the total text. The theme includes five categories comprised of 26 codes and includes 210 passages made up of 47,227 characters of text. The categories and codes in this theme relate to patterns of thinking, as well as personal and socio-cultural values or responsibilities. Figure 4 below shows the P/C Mean Percentage of each category within this theme.

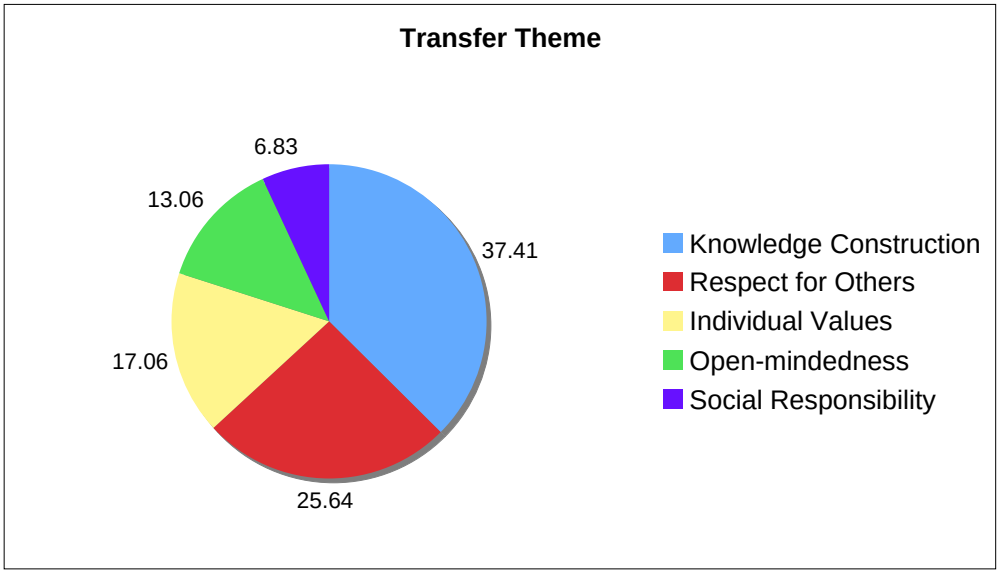

Figure 4. P/C mean percentage of text in Transfer theme by category.

The **Knowledge Construction** category represents the largest segment of this theme at 37.41%. a finding which is promising with respect to the goals of the design. Indeed, this category represents 7.9% of the total text, the third largest category in overall text. The **Respect for Others** category is also strongly represented at 25.64% of the theme and 5.43% of the text overall. **Individual Values** is the third largest category in the theme, followed by **Open-mindedness** and **Social Responsibility**. Table 4 displays the categories and codes, as well as their respective weights within this theme and the entire text.

Table 4. Passage/character mean weights for categories and codes in Transfer theme

Categories	Codes		% of Category	% of Theme	% of Total Text
Knowledge Construction	*Integrating Disciplines*		29.20	10.76	2.31
	Making Connex to New Ideas		21.05	7.79	1.66
	Applying to New Contexts		21.44	7.94	1.68
	Creating/Constructing Something New		10.26	3.86	0.78
	Evaluating Against Norms		18.05	6.67	1.42
Totals		**5**	**100.00**	**37.02**	**7.85**
Respect for Others	*Different Cultures*		24.49	6.26	1.34
	Opinions/Perspectives		19.73	5.05	1.07
	Social Negotiation/Consensus		17.77	4.55	0.97
	Value of Collaboration		14.42	3.69	0.79
	Strengths/Talents/Goals		12.10	3.11	0.65
	Differences w/I Culture		11.49	2.94	0.63
Totals		**6**	**100.00**	**25.60**	**5.44**
Individual/ Personal Values	*Exercising Judgment/Being Informed*		23.71	4.18	0.90
	Work Ethic		16.98	3.18	0.72
	Creativity/Self-Expression/Emotion		20.42	3.53	0.75
	Wholeness		14.14	2.55	0.56
	Reliability/Responsibility		10.76	1.87	0.40
	Honesty/Avoiding Plagiarism		9.36	1.60	0.33
	Logic/Rationalization		4.62	0.79	0.16
Totals		**7**	**100.00**	**17.69**	**3.82**
Openmindedness	*Technologies*		34.50	4.46	0.96
	New Ideas/Perspectives		29.01	3.71	0.78
	Reevaluating Old Ideas		25.38	3.33	0.73
	Aesthetic Appreciation		11.11	1.43	0.31
Totals		**4**	**100.00**	**12.93**	**2.77**
Social Responsibility	*Self IN Society*		57.40	3.91	0.82
	Need for Action		19.69	1.32	0.28
	Protecting Planet		12.36	0.84	0.18
	Do No Harm		10.55	0.68	0.15
Totals		**4**	**100.00**	**6.75**	**1.42**
Theme Totals		**26**			
Text Totals		**157**			

The third research question explored the extent to which the course promoted attainment of the overarching program objectives and advanced conceptual age thinking. The Knowledge Construction category and sequence of codes that comprise it strongly suggest that the course was successful in fostering the synthesis or big picture thinking vital to the conceptual age and one of the program objectives, integrating knowledge from the scholarly disciplines. The other categories, Social Responsibility, Open-mindedness, as well as Individual or Personal Values suggest that students achieved a measure of the empathic thinking needed in the conceptual age and several of the program objectives, specifically those related to the relationship between self and society,

the responsibilities of living in a culturally and ethnically diverse world, and the development of values for ethical behavior.

Results Theme

The ***Results*** theme examines what worked well and what did not, the tensions and successes that occurred in this semester-long implementation. The **Instructional Methods** category comprises the largest percentage of this theme, with **Students** and **Curriculum & Assessment** representing the second and third most important categories. Figure 5 shows the weights of each category within this theme.

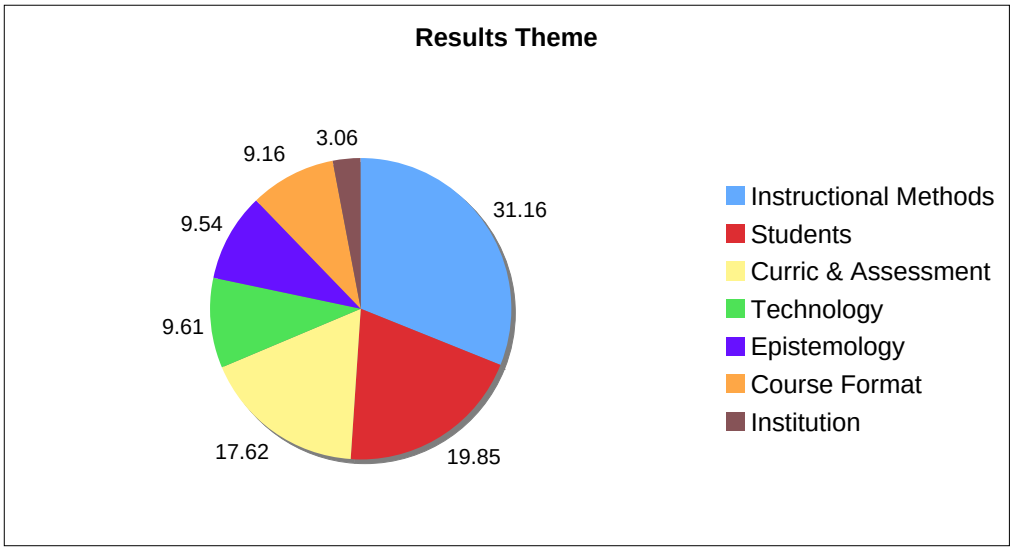

Figure 5. P/C mean percentage of text in Results theme by category.

In relation to the entire text, this theme is the second largest of the four themes, representing almost a third (29.19%). However, this is the only theme that included data from the instructor interviews, which did have an impact on its weight within the overall study. Table 5 displays the categories and codes, as well as their respective weights within this theme and the entire text.

Table 5. Passage/character mean weights for categories and codes in Results theme

Categories	Codes		% of Category	% of Theme	% of Total Text
Instructional Methods	*Sequence/Time to Design ARG*		8.81	2.75	0.81
	Guided vs Directed Instruction		8.19	2.56	0.76
	Encouraging vs Forcing		8.18	2.56	0.75
	Student Expectations		5.74	1.80	0.52
Tensions	*Time Necessary for Consensus*		5.01	1.57	0.46
Successes	*Attainment of Core Perspectives*		18.32	5.73	1.68
	Transfer/Relevance to Real World		8.61	2.69	0.78
	Instructors/Interaction w/ them		8.20	2.56	0.76
	Open Learning Environment		7.11	2.22	0.66
	Personal Responsibility for Learning		6.38	1.99	0.58
	Encouraging Learning/Risk-taking		4.36	1.36	0.40
	GVP vs Traditional Instruction		3.91	1.22	0.36
	Building/Creating Something New		3.20	1.00	0.30
	Strengthening Prior Knowledge		3.07	0.96	0.28
	Empowerment from Design		0.89	0.28	0.08
Totals		**15**	**100.00**	**31.27**	**9.17**
Students	*Lack of Leadership/Too Many Ideas*		15.14	3.04	0.89
	Individual Tasks for Group Project		13.82	2.78	0.81
	Communication Challenges		10.92	2.18	0.64
	Non-participation/Accountability to Group		6.90	1.38	0.41
	Conflict Between Students		6.25	1.26	0.37
	Student Self-Regulation Challenge		6.00	1.19	0.35
	Difficulty Organizing Group/Work		3.82	0.77	0.22
Tensions	*Giving Up Control/Taking Risks*		2.18	0.44	0.13
Successes	*Learning From Peers*		13.36	2.68	0.79
	Synergy/Close Relationships		9.87	1.98	0.58
	Personal Responsibility to Group		6.27	1.26	0.37
	Peer Teaching/Sharing Life Experiences		3.17	0.64	0.19
	Roles/Others' Strengths as Assets		2.31	0.47	0.14
Totals		**13**	**100.00**	**20.07**	**5.88**
Curriculum & Assessment	*Contextualizing C&A w/I ARG*		21.71	3.78	1.11
	Meeting Course-level Objectives		13.10	2.28	0.67
	Communicating Expectations		12.48	2.16	0.63
	Covering Material/Content		8.78	1.53	0.45
	Assessing Core Perspectives		5.26	0.92	0.27
Tensions	*"Learn the Apply" Approach*		4.02	0.70	0.20
Successes	*Integrating Disciplines*		13.68	2.38	0.70
	Enjoyed the Course		12.93	2.26	0.67
	Content Establishes Foundation		4.55	0.79	0.23
	Increased Substance		3.49	0.61	0.18
Totals		**10**	**100.00**	**17.41**	**5.11**

Table 5 continued

Categories	Codes		% of Category	% of Theme	% of Total Text
Technology	*Tech as Impediment to Learning*		20.69	1.96	0.58
Tensions	*Limitations of Learn Lab*		8.23	0.78	0.23
Successes	*Tech as Organizer/Motivator/Comm*		23.73	2.26	0.66
	Learn Lab Enhancing Learning		23.58	2.24	0.66
	Tech as Tool to Improve Learning		11.38	1.09	0.32
	Co-Learning w/ Students		7.02	0.67	0.20
	Increased Confidence w/ Tech		5.35	0.50	0.15
Totals		**7**	**100.00**	**9.50**	**2.78**
Epistemology	*Between Instructor & Design*		28.23	2.65	0.78
	Between Instructors		14.18	1.34	0.39
	Between Students		12.03	1.13	0.33
	Between Student & Design/Methods		11.15	1.04	0.31
Tensions	*Within Student/Learning Preferences*		8.66	0.83	0.24
Successes	*Value of Opinion w/ Respect to Design*		13.73	1.30	0.38
	Instructors's Values Align w/ Design		12.02	1.15	0.33
Totals		**7**	**100.00**	**9.43**	**2.76**
Course Format	*One Mtg Per Week*		20.13	1.84	0.54
	Hybrid/Half Online		19.12	1.79	0.53
	Reluctance to Work Online		19.08	1.78	0.53
	Inadequate Face Time		10.70	1.03	0.31
Tensions	*Class Size*		7.22	0.68	0.20
Successes	*Working Together While Separated*		12.88	1.13	0.32
	Class Size		4.55	0.43	0.13
	6-Credit Class		6.33	0.61	0.18
Totals		**8**	**100.00**	**9.29**	**2.74**
Institutional	*Load*		26.52	0.75	0.22
	Retention		22.24	0.69	0.20
Tensions	*Time*		21.54	0.67	0.20
Successes	*Teaching Partner*		29.69	0.92	0.27
Totals		**4**	**100.00**	**3.02**	**0.89**
Theme Totals		**64**			
Text Totals		**157**			

Despite various successes with the course design, several challenges or tensions emerged from the design. The strongest of these tensions was the amount of time necessary to develop the game. On the one hand, part of this tension was the reduced face time resulting from the hybrid design. However, much of that was alleviated once students realized that they could and should be communicating with each other at a distance. The tension between guided as opposed to directed instruction was also strong. Students seemed to learn the most from developing the game, a project that was much less instructor-directed, but preferred learning with more direction. This finding is not unusual among students accustomed the directed instruction typified in an education system focused on preparing students for standardized tests (Kelly, 2005; Ladd, 2008; Wasley, 2008).

The strongest tension among students when designing the game was the lack of leadership, which further illuminates the tension between directed and guided instruction. Their uneasiness with the lack of direction was compounded by the dwindling time and impending end of the semester; being told what to do speeds things up. Consequently, this was a source of tension among students. For the most part, other tensions among students related to self-regulation, participation, and individual accountability, the usual challenges that occur in group projects (Johnson & Johnson, 1994). Despite these challenges, students learned from each other and preferred that mode to learning from the teacher.

Implications

The results of this study bear implications for implementing problem-based capstone experience designs. The principal implications for the design of this particular capstone course include the following:

- *Begin Game Development Sooner.* Although a great deal of the attainment of the program objectives and conceptual age thinking that were the goals of the course can be attributed to both the course content and the game design scenario that followed later, game development must begin at the onset of the course for the project to be more fully effective.
- *Foster More Interdependence.* One of the course successes, perhaps a success of the hybrid design, was the self-direction that it obliged students to develop, an aptitude vital to life-long learning and an asset in a global knowledge economy (Peter D. Hart Research Associates, 2008). Nevertheless, students should not feel hindered by the delivery mode of a course. Using technologies with which students routinely communicate might promote greater interdependence (Bonk & Zhang, 2008).
- *Enable Group Self-organization.* Engaging students in the central problem scenario and fostering interdependence sooner could also allow students groups to better self-organize. As several students indicated, identifying each other's strengths takes time. Promoting concept development and greater interdependence earlier could better allow these strengths to emerge, so that students can assign and shift roles with greater facility (Brush & Saye, 2001; Johnson & Johnson, 1994).

This presentation will also discuss directions for future research given the above implications of the study.

References

Barrett, H. C. (2007). Researching Electronic Portfolios and Learner Engagement: The REFLECT Initiative. *Journal of Adolescent & Adult Literacy, 50*(6), 436.

Bonk, C., & Zhang, K. (2008). *Empowering online learning*. San Francisco: Jossey-Bass.

Brush, T., & Saye, J. (2001). The use of embedded scaffolds with hypermedia-supported student-centered learning. *Journal of Educational Multimedia and Hypermedia, 10*(4), 333-356.

Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education [Electronic Version]. *AAHE Bulletin*. Retrieved March 29, 2006 from http://www.csueastbay.edu/wasc/pdfs/End%20Note.pdf.

Chickering, A. W., & Gamson, Z. F. (1991). Development and adaptations of the seven principles for good practice in undergraduate education. *New Directions for Teaching and Learning* (Winter), 75-81.

Conrad, D. (2002). Engagement, excitement, anxiety, and fear: Learners' experiences of starting and online course. *American Journal of Distance Education, 16*(4), 205-222.

Duffy, T. M., & Cunningham, D. J. (1996). Constructivism: Implications for the design and delivery of instruction. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology*. NY: Macmillan.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine Publication Company.

Hart Research Associates. (2008). *How should colleges assess and improve student learning: A survey of employers conducted on behalf of the Association of American Colleges and Universities*. Washington, D.C.: Association of American Colleges and Universities.

Hassenplug, C. A., & Harnish, D. (1998). The nature and importance of interaction in distance education credit classes at technical institutes. . *Community College Journal of Research and Practice, 22*(6), 591-606.

Johnson, D. W., & Johnson, R. T. (1994). *Learning together and alone: Cooperative, competitive, and individualistic learning* (4th ed.). Needham Heights, MA: Allyn and Bacon.

Jonassen, D. H. (1999). Designing constructivist learning environments. In C. M. Reigeluth (Ed.), *Instructional design theories and models: A new paradigm of instructional theory* (Vol. 2, pp. 215-239). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Juniewicz, K. (2003). Student Portfolios with a Purpose. *Clearing House: A Journal of Educational Strategies, Issues and Ideas, 77*(2ov-Dec), 73.

Kelly, H. (2005). Games, cookies, and the future of education. *Issues in Science & Technology, 21*(4), 33-40.

Kirkpatrick, D. L. (1994). *Evaluating training programs: The four levels*. San Francisco: Berrett-Koehler.

Koljatic, M., & Kuh, G. (2001). A longitudinal assessment of college student engagement in good practices in undergraduate education. *Higher Education, 42*, 351-337.

Kuh, G., Pace, C. R., & Vesper, N. (1997). The development of process indicators to estimate student gains associated with good practices in undergraduate education. *Research in Higher Education, 38*(4), 435-454.

Ladd, H. F. (2008). Rethinking the way we hold schools accountable [Electronic Version]. *Education Week*. Retrieved January 22, 2008 from http://www.edweek.org/ew/articles/2008/01/23/20ladd.h27.html.

Peter D. Hart Research Associates. (2008). *How should colleges assess and improve student learning: A survey of employers conducted on behalf of the Association of American Colleges and Universities*. Washington, D.C.: Association of American Colleges and Universities.

Pullman, G. (2002). Electronic portfolios revisited: The efolios project. *Computers and Composition, 19*(2), 151.

Segers, M., Gijbels, D., & Thurlings, M. (2008). The Relationship between Students' Perceptions of Portfolio Assessment Practice and Their Approaches to Learning. *Educational Studies, 34*(1), 35.

Strauss, A. L., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage.

Van Tartwijk, J., Driessen, E., Van Der Vleuten, C., & Stokking, K. (2007). Factors Influencing the Successful Introduction of Portfolios. *Quality in Higher Education, 13*(1), 69.

Warren, S. J., Dondlinger, M. J., & McLeod, J. (2008). *Power, play and PBL in postsecondary learning: Leveraging design models, emerging technologies, and game elements to transform large group instruction*. Paper presented at the Annual Meeting of the American Educational Research Association.

Wasley, P. (2008). Tests aren't best way to evaluate graduates' skills, business leaders say in survey [Electronic Version]. *The Chronicle of Higher Education*. Retrieved January 23, 2008 from http://chronicle.com/daily/2008/01/1340n.htm.

Yin, R. K. (2003). *Case Study Research: Design and Methods* (3rd ed. Vol. 5). Thousand Oaks, CA: Sage.