Enabling Micro-Collaboration between Expert and IDD Team

> …a wholly different form of digitally mediated experience that began as entertainment is emerging as a powerful form of learning based on a very different model of what it means to know and understand. A new model of eLearning commonly called digital game based learning, is emerging as an alternative vision for eLearning (Squire, 2005, p. 6).

The allure of computer-mediated instruction to educate adults on complex subjects began as early as the 1960s with the success of the "flight simulator," laser-discs, personal computers, and finally computer games and simulations. Educators are attracted to games and simulations because they emphasize "learning by doing" rather than simply "learning by knowing". Educational leaders funding software development projects pursue the potential of educational computer games and simulations to improve the teaching-learning transaction. Simple simulators with game elements can offer graduate and undergraduate students invaluable hands-on "lab time" in otherwise impractical situations. WYSWYG tools, low-cost software, and an abundance of Adobe Flash and server-side programmers have brought development of computer games and simulations within the reach of most university budgets. Yet game/sim budgets can run into six-figures because it takes a team of experts to create them.

Often the tacit knowledge or invisible systems that must be programmed into the software's artificial intelligence is held only by experts who often have difficulty sharing with designers and developers (Aldrich, 2009). This expertise sharing can be accomplished by enabling micro (small group) collaboration. Consequently, educational technology leaders have a responsibility to use techniques to facilitate collaboration and engagement between the instructional design and development team (IDD) and subject matter experts. Extensive expert contribution is essential to the development of feature-rich game-based learning activities or simulation activities. Enabling increased micro-collaboration between the expert and the design and development team can be accomplished through encouraging five main factors: flattening of power relationships, controlling momentum, using communication tools, promoting formative evaluation and project management acumen.

The Emergence of "Team"

For centuries, higher education instructors have enjoyed autonomy when it came to development of classroom activities and instruction--the teaching and learning transaction. To be sure some have sought information on making classroom experiences interactive, as opposed to a typical didactic lecture. Yet many subject matter experts are more comfortable simply "telling" the material to students.

The emergence of distance education via Internet technology required that a team of skilled individuals work together to produce the educational experience. The online learning development team often includes the professor/ subject matter expert, instructional designer, software programmer, and project manager (Berge, 2002). The necessity for a team approach requires a collaborative effort; "new ways of communicating and new communication boundaries, additional workers, and interdepartmental coordination to be done successful" (Moller, Foshay, Huett, 2008, p. 68). The emergence of computer-driven learning activities requires individuals with the skill to assemble and distribute computer code. Successful game and simulation software development thus requires strong collaborative processes that bring together domain expertise and technological skills and process knowledge (Chau & Maurer, 2004). Today, professors developing computer game and simulation development need a team with the following skill sets: instructional game designer, artistic illustrator, programmers (server-side and web facing) and a project manager (Aleckson, 2009). This collaborative effort often requires communication loops and continuous learning between IDD team members and the expert faculty member. Developing games and

simulations also requires the IDD team to experiment with new approaches such as "repeating ADDIE models," and the adoption of software development techniques like SCRUM and AGILE. The heart of these new processes, at the university level, is the notion of creating an egalitarian team (which includes the subject domain expert), control of momentum through use of collaborative communication tools, utilization of formative evaluation in the form of active user testing cycles, and the employment of specific project management techniques that promote time box cycles and adherence to the triple constraint (the management of time, cost, quality).

The Leadership Challenge of Creating Team Equality

It is no easy task to facilitate a level playing field of mutual respect between the faculty member and computer support personnel, especially given the "job shop" history of service that technology departments have provided. Creating micro-collaborative environments should start at the programmatic level; controlling the money, positioning IT and ISD staff as experts, and making a commitment to evaluation and campus-wide promotion goes a long way to promote collaboration at the interdepartmental and at the project level.

At the University of Wisconsin- Madison, the Department of Instructional Technology's (DoIT) efforts to transform teaching and learning with technology is epitomized by Engage Program grants to faculty members. The funding to develop educational games and simulations is controlled by the Engage Program to ward against the standard faculty member "buying services" (http://engage.wisc.edu/). A single decision to control project funds has gone a long way in attaining respect for the Engage Program and helped equalize the playing field of project team dynamics. This program-level decision has enabled greater micro-collaboration on the game/sim project level between the IDD team and the faculty expert. The Engage Program has also made a commitment to staff professional development. Therefore, the faculty expert is more likely to perceive IDD team members as game and pedagogical design experts, and project managers are positioned as IT staff who understands the new process paradigms necessary for complex software development. The UW DoIT managers implicitly understood that building educational games/sims would take micro-collaboration and have taken subtle efforts to encourage it, including creating a "creative boutique-like" office environment. Engage Program staff members agree that enabling collaboration with faculty experts is all about creating an egalitarian design and development environment. In a personal email to me, one staffer defined collaboration this way:

> Collaboration: a phenomena that occurs when:
>
> 1. DIVERSE members of a working team
> 2. are able to SHARE their expertise
> 3. in a manner where EMERGENT ideas/designs are created
> 4. that no one member can claim OWNERSHIP

Engage managers have also enabled micro-collaboration and expertise sharing by re-positioning the image of their IT staff experts through a campus-wide promotional effort. This included the formation of an advisory group, symposiums, brown bags and the bi-annual publishing of evaluation reports on their game/sim projects.

Expertise Sharing and Project Momentum

Indeed, collaboration is often defined as experts (the IDD team and SME) unselfishly sharing to accomplish a common goal. Leaders can promote this "sharing of expertise" by encouraging the use of

meeting protocols, visual representation tools, and web-based conferencing, project team site, or wiki. These tools afford increased communication loops and help control project momentum, which in turn encourage greater information sharing and overall project participation from the faculty expert. It is important to reflect on how project leader affordances, like managing development steps and conducting meetings, affect collaboration. Facilitating brainstorming sessions, use of prototyping, user testing and formative evaluation are other examples of leader-promoted affordances (Knox, 2002). Leadership affordances may take the form of decisions regarding the methods for conducting a review meeting or the type of development process utilized in implementation (Halverson, 2004). Similarly, the leader's use of design and communication tools, such as flow charts or concept maps also impact collaboration. For example, instructional designers can build common ground with the subject matter expert by expressing a desire to learn the content domain as a novice. Bonding over discussions about video game design mechanics and educational simulations will go a long way in establishing models of best practice but will also identify, in the faculty member's mind, why games and simulations engage users. Sometimes designers use formal heuristics, like a list of video games using certain techniques like "tutorial level" or "character embodiment' (Squire, 2005).

IDD team members at both the University of Wisconsin Engage program and a Madison, WI private-sector eLearning development company, Web Courseworks find ways to generate expertise sharing to gain mutual respect and to improve the design process. Requiring a standing meeting with the subject matter experts, for example, not only keeps the project "humming along" but allows for brainstorming sessions. To show respect for time, Web Courseworks holds weekly virtual web conference meetings, even when the expert is local. Using visual representation techniques will also draw out subject matter expert discussion on what game/sim mechanics are applicable to the content domain, while defining the usual features and web interface. Engage management promotes multiple visualization tools by posting a link on their website to the periodic table of visualization techniques (http://www.visual-literacy.org/periodic_table/periodic_table.html). One Engage IDD team worked with an engineering professor to create a game/sim called "Cool It" to allow students to embody the role of a cryogenics scientist. The project manager was diligent about posting pictures of mutually agreed upon white board drawings to the Engage Wiki site. Storing project documents in a central web-based location allowed Engage team members (including the professor) to quickly get up to speed on creative concepts discussed at previous meetings. A team website is an ideal location to post informational assets, web links to prototypes, and meeting minutes. Project managers at Web Courseworks believe their weekly meetings and aggressive use of a team site helps them keep the project in scope and on schedule. The UW Engage "Cool It" project also regularly posted results of user testing sessions on their wiki. Engage utilized the Agile development process of producing rapid prototype versions for user testing. Notes were drafted from these formative evaluation sessions and presented to the faculty expert meetings for discussion and reflection.

Formative Evaluation & Project Management

The use of formative evaluation can significantly and continuously motivate all stakeholders to collaborate throughout all phases of the design and development process. Software developers like to use the term "user testing" but getting the input of novice learners and users of software has been in practice for decades. Barbara Flagg, formally of Harvard University, in *Formative Evaluation for Educational Technologies* eloquently tells the story of how formative evaluation helped establish the character of Big Bird in the wildly successful Public Television's educational show Sesame Street (Flagg, 1990). Today, the Engage program management feels so strongly about on-going evaluation that it maintains an evaluator staff position. Web Courseworks insists on a minimum of three formal user testing sessions during each six month development cycle. During a game/sim project being collaboratively developed with the World Anti-Doping Agency, web-based surveys ensure all stakeholders can reflect on the user

feedback from youth elite athletes who are testing prototypes and final versions of the game. In another Web Courseworks project, formative evaluation feedback was used to improve the artificial intelligence of a dialogue simulator in use by international Olympic coaches to practice ways of speaking to athletes.

The involvement of learners, IDD team members and experts can truly enhance a game or simulation by harvesting the explicit and tacit knowledge needed to create effective and engaging games and simulations. This effort of harvesting needs to be a primary responsibility of the project manager. Although the www.pmi.org book of project management provides a logistical roadmap for managing scope, schedule and cost, the project manager should also play a key leadership role in enabling micro-collaboration. The project's formal and informal leaders use communication tools and protocols to help promote an egalitarian atmosphere, expertise sharing enabled through visual representation and other methods, adherence to agile development processes like short time-boxed prototype cycles, and scheduled use of reflective formative evaluation.

References

Aleckson, J. (2010). Managing eLearning [web log message]. Retrieved from http://www.webcourseworks.com/blog .

Aldrich, C. (2009). *The complete guide to serious games and simulations*. San Fransisco, CA: Pfeiffer.

Berge Z. (2002). Active, Interactive, and Reflective eLearning. *The Quarterly Review of Distance Education*, 3(2).

Chau, T., & Maurer, F. (2004). Knowledge Sharing in Agile Software Teams. *Lecture Notes in Computer Science*, 3075, 173-183. Retrieved from SpringerLink database.

Flagg, B. N. (1990). *Formative evaluation for educational technologies*. Hillsdale, NJ: Erlbaum.

Gibson, D, Aldrich, C. & Prensky, M. (2007). Games and simulations in online learning: Research and development frameworks. *Information Science Publishing*.

Halverson, R. (2004). Accessing, Documenting, and Communicating Practical Wisdom: The Phronesis of School Leadership Practice. *American Journal of Education*, 111.

Kang, S. (2001). Toward a collaborative model for the design of web-based courses. *Educational Technology*, 41(2), 22-30.

Knox, A.B. (2002). *Evaluation for continuing education: A comprehensive guide to success*. San Francisco, CA: Jossey-Bass.

Moller, L., Foshay, W.R., & Huett, J. (2008, July/August). The Evolution of Distance Education: Implications for Instructional Design on the Potential of the Web. *Tech Trends*, 52(4), 66.

Pfotenhauer, J. Gagnon, D. Litzkow, M. Blakesley, C. (2009). *Designing and using an on-line game to teach engineering*. Paper presented at 39th ASEE/IEEE Frontiers in Education Conference. San Antonio, TX.

Squire, K. (2005). Game-Based Learning: An xlearn perspective paper. *Masie Center eLearning Consortium*.

Biographical Sketch

Jon Aleckson is a veteran entrepreneur of 26 years, owning and operating several eMedia development companies. His passion for interactive learning led to the creation of Web Courseworks in 2000. Jon is currently a Ph.D. candidate at the University of Wisconsin-Madison in the Educational Leadership & Policy Analysis Department and has taken multiple courses in the Games, Learning, and Society Department. He is a frequent session speaker at training and development conferences, speaking on topics such as project managing eCourse development, quality standards, using collaboration tools and team sites during development, and producing engaging eLearning for adult learners.

Address:	7617 Mineral Point Rd. Suite 301 Madison, WI 53717
E-mail:	jonaleckson@webcourseworks.com
URL:	http://www.webcourseworks.com http://www.webcourseworks.com/blog
Phone:	608-824-8900 ext.15
Fax:	608-824-8908