

# **Evaluating Team Development in Game-Based Environments**

**Cole Wrampelmeier**

**American University**

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## **1. Hypothesis and Rationale**

In his paper on games and learning, Marc Prensky makes the claim that we have a generation of “digital natives” who learn and are motivated in new ways. Ten years later we now see these digital natives in the workforce, indeed many already were, contributing to their work cultures and society at large. Critical to modern operations in the workplace are teams, defined as social systems of three or more individuals embedded in a specific context with a shared identity and task.

Analysis of teams have attempted to create labs to study team dynamics, specifically looking at “Synthetic Task Environments” (STEs) but these scenarios only assist for the task of observing team development in an unobtrusive manner. This paper serves as a preliminary study on the individuals’ perception of team effectiveness. Using responses from a five point scale questionnaire this study seeks to compare the similarities between team development in the workplace and team based games. This paper also seeks to identify the unique ways that games encourage positive team development.

## **2. Methods and Protocol**

- Data will be gathered by the author in this preliminary study using a fully-standardized five point Likert scale questionnaire. Questionnaire will include 24 with a comments section to leave additional thoughts. Questionnaire will be subject to change depending on results of pre-test.
  - Developing this questionnaire will be a multi-step process (described below), with a pre-test to ensure clarity of the questionnaire and to assess the validity of the questions as accurate measures of teamwork.
  - Questionnaire will be self-administered online to reduce potential interviewer effects.
- Questionnaire will include a demographics section with some optional demographics questions (race, gender) and other required questions (team leader/team member, length of time in current organization). This section will, initially, be made up of six questions.
- Questionnaire will ask respondents to rate the team performance with 12 questions across four distinct categories shared across the language of the literature reviewed for this study:
  - Communication - frequency, intensity, and openness of communication across the team

- Cohesion/motivation - was the team eager to continue working on the task, did leadership effectively motivate the team, was there a clear team identity
- Coordination - were individual efforts structured, team members able to apply their individual expertise/skill, did the team prepare before acting upon the task
- Effectiveness - did team members support each other, were goals set by the team accomplished, were individual expectations set and met
- Questionnaire will also approach individual performance/growth with 6 questions that examine two distinct categories:
  - Skills/Learning - does respondent feel more competent at the task after working in the team, did working in a team help or detract from understanding the task, did working in a team provide a clear goal/responsibility for respondent as an individual
  - Satisfaction/Socialization - was the task an enjoyable experience in the team, did respondent feel they were able to have an impact on team performance, was respondent able to clearly understand
- Questionnaire will remain broad enough for use by individuals in game-based and workplace teams.
  - A part of the pre-test assessment will refine the definition of a “team” used in the questionnaire in order to ensure that bo

Language drawn from questionnaires will be an adapted aggregation of three distinct studies on teamwork, two studies of traditional teams and the third a study of game-based team performance. The first set of terms focuses on “Teamwork Qualities” (TWQ) from Hoegl and Gemuenden’s study of German software engineers:

<b>Table 1. TWQ (Traditional Team)</b>	
Communication	Is there sufficiently frequent, informal, direct, and open communication
Coordination	Are individual efforts well structured and synchronized within the team?
Balance of Member Contributions	Are all team members able to bring in their expertise to their full potential?
Mutual Support	Do team members help and support each other in carrying out their tasks?
Effort	Do team members exert all efforts to the team's tasks?
Cohesion	Are team members motivated to maintain the team? Is there team spirit?

The second set of terms examines “Knowledge, Skill, and Ability (KSA) requirements for teamwork”, a study of social aspects in the workplace and how behaviour can be examined to enhance teamwork in the workplace.

<b>Table 2. KSA Table 1 (Traditional Team)</b>		
Interpersonal Skills	Conflict Resolution KSAs	1. Recognize and encourage desirable, but discourage undesirable, team conflict 2. Recognize type and source of conflict confronting the team and implement an appropriate conflict resolution strategy 3. Employ an integrative (win-win) negotiation strategy rather than the traditional distributive (win-lose) strategy
	Collaborative Problem Solving KSAs	4. Identify situations requiring participative group problem solving and to utilize the proper degree and type of participation 5. recognize the obstacles to collaborative group problem solving and implement appropriate corrective actions
	Communication KSAs	6. Understand communication networks, and to utilize decentralized networks to enhance communication where possible 7. communicate openly and supportively, that is, to send messages which are: (1) behavior- or event-oriented; (2) congruent; (3) validating; (4) conjunctive; and (5) owned 8. Listen non evaluatively and to appropriately use active listening techniques 9. maximize consonance between nonverbal and verbal messages, and to recognize and interpret the nonverbal messages of others engage in ritual greetings and small talk, and a recognition of their importance
Self-Management KSAs	Goal Setting and Performance Management KSAs	11. Establish specific, challenging, and accepted team goals 12. Monitor, evaluate, and provide feedback on both overall team performance
	Planning and Task Coordination KSAs	13. Coordinate and synchronize activities, information, and task interdependencies between team members. 14. Help establish task and role expectations of individual team members, and to ensure proper balancing of workload in the team

The third section of language comes from a military study that used the fantasy MMO *NeverWinter Nights* (Bioware, 2002) as a training tool for soldiers to develop teamwork.

<b>Table 3. Teamwork Skills Supporting Team Effectiveness (Game Team)</b>	
Leadership	The ability to direct and coordinate the activities of other team members, assess team performance, assign tasks, motivate team members, plan and organize and establish a positive atmosphere.
Monitoring	The ability to develop common understandings of the team environment and apply appropriate task strategies and processes in order to accurately monitor teammate performance.
Adaptability	The ability to adjust strategies based on information gathered from the environment through the use of compensatory behavior and reallocation of intra-team resources; altering a course of action or team repertoire in response to changing conditions (internal or external).
Team Orientation	Propensity to take other's behavior into account during group interaction and the belief in the importance of team goal's over individual member's goals.
Closed Loop Communication	The practice of confirming receipt and understanding of others' communications. This practice builds trust in the communication skills, knowledge, and intent of others and ensures that information is accurately conveyed.
Team Mental Models	The ability to accurately represent the capabilities of others, their responsibilities, and their perception of the state of the world.
Coordination	The practice of planning, preparing, organizing people and/or tasking to accomplish a goal.
Communication Push	The practice of sharing or sending information with/to others.
Communication Pull	The practice of seeking information from others or other data sources; asking questions; attempts to gather intelligence.

### 3. Research Plan

The purpose of the questionnaire is two-fold; (1) to examine differences in perceptions of teamwork between work environments and game environments; (2) to identify the positive development of teamwork qualities in team-based games. The questionnaire will use surveymonkey as a distribution platform, a sorting system will be implemented to sort through the IP addresses and remove any potential duplicate submissions from respondents.

- Pre-test assessment of questionnaire will make use of a game community within social proximity to the author.
  - Planetside 2 (Daybreak Game Company, 2012), Emerald server - US East Coast, D3RP Company.

- Given social ties to the author and to avoid bias these results will not be used beyond pre-test assessment for question clarity and relevance to study questions.
- Survey results from D3RP Company will be refined and altered to clarify and ensure understanding. Individual interviews will be conducted with select respondents when needed to gain additional feedback
- Groups in several other large team based Massive Multiplayer Online (MMO) games will be contacted for participation in this study and assistance with the dispersal of the survey. Official forum moderators as well as moderators of unofficial forum channels will be contacted to aid in the dissemination of the survey
- Data gathered will be run through several analyses that team studies use in order to account for biases, including a control from Henik and Tzelgov (1985) that controls for halo effect - an effect that causes team members' success to rate all performance measures favourably.
  - This study will also use two modelling techniques including a Hierarchical Linear Modeling (HLM) technique and a dynamic systems approach to modelling that specifically looks at newly composed teams (Salas, Cooke, Rosen 2008)
  - Data will also be run through a comparison with

#### **4. Timeline and Budget (during class)**

- ASSESSMENT: D3RP Company questionnaire assessment to be completed in the next 2 weeks - completed by Mar 14
- EVALUATION: Questions assessed, refined, and altered during the next week (March 14-21) with leadership target communities initially contacted to assist with dispersal of questionnaire - completed by Mar 21
- DISPERSAL(game): Questionnaire, once completed will be sent out to target MMO communities (primary games targeted will be *Eve Online*, *Planetside 2*, *World of Warcraft*) immediately after evaluation (March 21) and remain available for responses for 21 days, until April 11.
  - While survey is out with respondents literature review will continue to evaluate the best statistical measures and eliminate team biases. Data from *Planetside 2* D3RP Company survey will be used for testing current methods.
- DISPERSAL(traditional): Questionnaire will also be sent to staff divisions at American University and will remain open for the same amount of time, March 21 - April 11.

#### **5. Extended Timeline and “Budget” (6-12 week extension)**

Ideally the findings from the initial questionnaire will be used to devise a study similar to that of the military study that used *Neverwinter Nights*. The study would identify a highly

adaptable game that can be easily accessed, for free or low cost, to test how different game elements affect the development of team effectiveness. Due to time constraints this would require the potential rental of a server space (~\$15.99/month) for online games and “modding” capabilities and potentially the need for fund to encourage participation.

This study would want a consistent group of participants in a group no smaller than 20. Multiple instances of this group size would be desirable. For this there would be a need for at least 20 copies of a games (provided there is a cost), 20 consoles or computer devices,

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