Exploring MMOG Groups and their Implications for the Design of Learning Environments

Vassilis Komis is professor at the department of Educational Sciences and Early Childhood Education, University of Patras. Iro Voulgari is member of the laboratory and teaching personnel at the Department of Early Childhood Education, University of Athens. Thierry Karsenti is professor at the Faculty of Education, University of Montreal (Canada)

Abstract

In this study we explore and map practices and processes used by Massively Multiplayer Online Game (MMOG) groups. We consider both the design of the environment and the behaviours of the players, and we identify issues such as factors that support the group goals of cohesion, success, and sociability; group structure and size; decision-making practices; communication modes; and interrelations among these issues. We use a mixed method research design that combines qualitative and quantitative approaches. We build on a theoretical framework for collaborative learning and group effectiveness, where learning refers to both knowledge acquisition and social experience. We conclude that a balanced integration of cognitive, social, and affective dimensions in the game can provide an effective gaming and learning experience.

Keywords

collaborative learning; games; groups; learning; MMOGs; Massively Multiplayer Online Games; virtual teams.

Practitioner Notes

What is already known about this topic

- MMOG groups play a critical role in the gaming learning process.

- An effective learning environment should support the learners' cognitive processes and outcomes, group dynamics, and the social and affective aspects

- Success of MMOG groups has been linked to structural, organisational, affective, and social elements.

What this paper adds

- Sociability and achievement defining factors for MMOG group cohesion.

- The groups' emergent rules and etiquette serve to regulate their operational effectiveness and the relational space.
- Group goals, structure, size, and practices (such as leadership and decision-making) constitute a matrix of interrelated factors.

Implications for practice and/or policy

- When creating virtual collaborative learning environments, educators and designers should consider how to best support cognitive as well as social and affective aspects within the groups.
- Educators and designers should take into account the evolving motivations, requirements, behaviours, and objectives of learners through their trajectory in the virtual environment.

Introduction

Massively Multiplayer Online Games (MMOGs) provide an excellent opportunity for examining how people organize online communities and groups, how they learn the norms and practices of these communities and of the environment they operate in, how they progress through tasks and achieve their goals, and the impact of the environmental design and social practices. MMOGs such as GUILD WARS 2 (ArenaNet, 2012), WORLD OF WARCRAFT (Blizzard Entertainment, 2005), LINEAGE II (NCsoft, 2003), EVE Online (CCP Games, 2003), and THE LORD OF THE RINGS ONLINE (Turbine, Inc., 2007) feature clear goals, integrated tasks and quests, and virtual characters that progress and evolve. Their promising potential for the design of learning environments has driven research in this area in recent years (Bartle, 2003; Carron et al., 2007; Dickey, 2007; Freitas & Griffiths, 2009; Riegle & Matejka, 2006; Steinkuehler, 2006). MMOG groups appear to play a critical role in the gaming learning process. Players acquire gaming expertise by participating in group practices and group tasks, by receiving help from other group members (e.g., mentorship), by trial and error, by collaborative assessment of failures, by discussing and planning new strategies and tactics, and by developing a shared understanding of the game world (Ahmad et al., 2010; Carr & Oliver, 2009; Chen, 2008; Oliver & Carr, 2009; Voulgari, Komis, & Sampson, 2014). Williams et al. (2006) explored and mapped some of the main issues in WORLD OF WARCRAFT guilds, including guild size, formal practices, leadership, guild churn, and what the guild meant for individual players. Group success and effectiveness was found to be influenced by both individual team performance and

inter- and intragroup social aspects (Benefield, Leavitt, & Shen, 2016). Researchers have identified various factors for MMOG group success, including joint participation in group tasks, the class balance ratio, group size, the level spread for group members, group activity, connectivity among members (Ducheneaut et al., 2007), social talk and social and affective aspects (Nardi & Harris, 2006; Pisan, 2007), shared goals, trust, fun, leadership, coordination, communication, and the communication media used (Korsgaard et al., 2010; Lisk et al., 2011; Ratan et al., 2010; Williams et al., 2007).

In this article, building on the previous research on MMOG groups, we apply a learning framework that incorporates cognitive, affective, and social components in order to conduct an in-depth investigation of groups and group practices. Contemporary learning theories stress the importance of not only the learner's internal cognitive processes and acquired knowledge, but also the learner's social and cultural environment and participation in collective practices (Sfard, 1998). Learning is more than an internal cognitive process; it is also a social activity that entails interacting with others and participating in community practices (Lave & Wenger, 1991; Roschelle & Teasley, 1995). An effective learning environment would support cognitive processes and outcomes as well as group dynamics, including social and affective aspects (Kreijns et al., 2003). The cognitive aspect refers to the knowledge that is available to the participants, the roles they assume, and the information they exchange, whereas the social aspect refers to the support that is provided by social interaction, the creation and maintenance of communities of learning and practice, the tools that are available for exchanging ideas and opinions, an authentic context, opportunities for active participation and collaborative problem solving, and multiple knowledge and information sources (Karasabbidis & Komis, 2008). Research in the areas of group effectiveness and collaborative learning and problem solving has furhter identified determinant factors for group effectiveness, such as group dynamics; relationships and the quality of communication among members; group members' knowledge, skills, and roles; and group structure, composition, and size (Avouris et al., 2004; Barron, 2003; Cohen, 1994; Dillenbourg, 1999). The affective aspect refers to the participants' motivations and emotions, which are equally important for an effective learning environment (Boekaerts, 2001; Järvelä & Volet, 2004).

Our objective, in this study, was to explore the emerging practices in MMOG groups. Using empirical data, we identify issues and we describe typologies of groups based on our theoretical

framework. Our main findings highlight the factors that contribute to group cohesion, group goals and motivations, rules and their objectives, different patterns of group structure and decision-making processes, and the communication tools used. A better understanding of the features and practices of virtual groups could inform the design of collaborative learning environments through the integration and support of the principles and features of effective collaborative interactions for successful learning and group dynamics.

Research design

We used a mixed method research design that combines qualitative and quantitative approaches. This allowed us to identify issues that emerged from a meaningful framework and view the issues holistically. We then compared, triangulated, and validated the findings (Aarseth, 2003; Creswell & Clark, 2007, p.14; Mason, 2002, p.62; Miles & Huberman, 1994, p.41).

For the qualitative approach, we used virtual ethnography. Data were collected from participant observation, whereby players of the MMOGs LINEAGE II and TRIBAL WARS (InnoGames, 2006) were observed. In addition, 20 semi-structured interviews and 2 focus groups were held with players of a variety of MMOGs. We also videotaped actual gameplaying by volunteer participants, and we referred to external resources such as websites, blogs, and forums to deepen our understanding of the observed MMOGs. The games the participants reported playing are presented in Table 1.

For the quantitative approach, we administered a questionnaire to assess several aspects of group collaboration described in the literature: leadership, group structure, group practices, social interactions and relationships, rules, group size, and communication tools. Following pilot interviews and trial surveys, the initial questionnaire was adjusted (see Appendix for survey items). The final questionnaire was administered via the online platform Survey Monkey. The survey targeted players of any MMOG who were aged 18 years and over. Most of the respondents were Greek. The demographics for the interview and questionnaire samples are summarized in Table 2. In order to ensure anonymity, no usernames or other identifying information of the players are disclosed.

The qualitative data were coded in a two-step process: data-driven coding and pattern coding. A model-driven approach was used based on constructs related to the main issues described above in the research background section (Saldana, 2009; Creswell, 2002, p.191; Gibbs, 2007, p.86).

The statistical analysis of the quantitative data was mainly descriptive, and was intended to obtain an overview of the sample and the issues discussed. We subsequently performed an exploratory analysis of the data to identify specific factors and phenomena and their relationships (correlations, x^2, ANOVA), as described in the discussion of the findings. The qualitative data were coded with the qualitative analysis software QSR Nvivo 8, and IBM SPSS 19 was used for the statistical analysis of the survey responses.

Table 1: MMOGs reported by players

Interview Participants	
MMOGs	Frequency
LINEAGE II (L2)	13
WORLD OF WARCRAFT (WOW)	4
DIABLO 2	3
EVE ONLINE	2
TRIBAL WARS (TW)	2
AGE OF CONAN (AOC)	1
FINAL FANTASY (FF)	1
RAPELZ	1

Survey Participants	
MMOGs	Relative frequency (%)
WORLD OF WARCRAFT (WoW)	35.71
LINEAGE II (L2)	19.05
IKARIAM	6.46
LORD OF THE RINGS ONLINE	5.78
EVE ONLINE	4.42
AION	3.74
TRIBAL WARS	2.04
Other	22.79

Table 2: Demographics of participants

Interview Participants	
Characteristic	Frequency
Age	
<18	7
18–24	3
25–34	13
35–44	3
45–54	1

Survey Participants		
Characteristic	Frequency	Relative frequency (%)
Age		
18–24	108	45.4
25–34	97	40.8
35–44	28	11.8

Education			45–54	4	1.7
High school	8		> 55	1	.4
Vocational training	6		N=	238	
Higher education	10		Education		
Postgraduate or more	3		High school	90	38.3
Gender			Vocational training	36	15.3
Male	21		Higher education	65	27.7
Female	6		Postgraduate or more	44	18.7
N=	27		N=	235	
			Gender		
			Male	214	91.1
			Female	21	8.9
			N=	235	

Findings and discussion

As indicated in the literature and in the results of our exploratory qualitative data analysis, factors such as group cohesion, goals, size, structure, rules, decision making processes, and communication tools are critical for both group effectiveness and learning. In thematic subsections, we consider these factors holistically in light of the combined qualitative and quantitative findings. The interviews were conducted in Greek, and representative quotations have been translated into English for presentation here.

Group cohesion: forces that keep members in the group

Group cohesion generally refers to the forces that keep a group together, or the links between the group and its members. These include their motives, the sense that they are part of a group, and their commitment. Cohesion is particularly critical for the development of a common knowledge space and for the emergence of effective collaborative learning processes (Garrison et al., 1999). Most MMOG players are members of groups. In our study, 25 of the 26 interviewed players and 87% of the survey respondents (N = 238) were members of a group. To identify what motivates players to join a group, the forces that keep them in the group, and the factors behind the emergence of a collective identity, we analysed the qualitative data. The results revealed two broad categories of forces: a) *social forces* and b) *achievement-related forces*.

Social forces refer to the social and interpersonal relations among the group members as well as their identification with the ideology and interests of the other group members. Social interactions, friendships, similar ideologies, and shared real-life interests appear to strengthen the bonds among members, whereas disruptions of these bonds may lead to disbanding.

> In one tribe, there was a clique of nationalists. The other members, they were more low profile, more moderate, and they did not like them. So the tribe was disbanded (TW, Male, 32y).

Similarly, the players recognized the benefits of grouping. An extensive part of the game content, and particularly at the higher levels, is available only to groups. Players have to form a group in order to explore the content, move up the levels, and confront competition. They remain in the group when it helps them progress their virtual characters and skills, for example, by participating in group activities when they feel that the group goals are compatible with their own goals, when goal achievement is linked to group goal achievement, when they feel that the game is fair and the loot and rewards are fairly distributed, when they cooperate well with the other members, and when they feel that they receive help and support, as illustrated in the following interview excerpt:

> There was this older player who was managing us and giving as the basic guidelines, answering our questions, and telling us how to complete the quests. He was making us something of a team (EVE Online, Male, 37y).

In addition, the intensity of these forces impacts member satisfaction. Based on our survey data, we constructed a new variable called *Group Cohesion* from items related to the social environment and group achievements (items: Q27.6, Q27.7, Q27.10, Q27.11R, Q27.12, Q27.13R, Q27.17R, Q27.22, Q27.32. Cronbach's Alpha = .769) and compared it with the latent variable *Group Satisfaction* (items Q27.9, Q27.15, Q27.23R. Cronbach's Alpha = .708). A strong correlation between the two variables emerged: the higher the perceived group cohesion, the more satisfied the players (r = .730, p = .001). The importance of sociability and achievement for group functioning was also supported by the results on group goals and the rules, as discussed in the following sections.

Group goals

Two predominant group goals emerged from the qualitative data analysis: *achievement,* or the successful accomplishment of game tasks and group progress up the levels, and *sociability,* or having fun and experiencing a friendly social environment, concurring with Williams et al. (2006). However, we were unable to categorise the MMOG groups in terms of their goals and objectives.

Although our initial assumption was that the groups would follow one of these two orientations (i.e., achievement-oriented or social-oriented), further analysis indicated that most groups held both goals, to a lesser or greater degree: achievement-oriented groups would also consider sociability as a critical factor for their success, and social-oriented groups would also consider task achievement and group progress as a favourable factor for group sustainment. To illustrate, one interviewee, a member of large, high-level, achievement-oriented group, reported:

> *If there is no social aspect, most of the groups, especially in the cases that for some reason they don't do any raids, if, for example, the guild master is offline or something, the players start to leave [the group]. If there is better bonding in the guild, then the guild will be sustained (WoW, Male, 29y).*

This complementarity between the two goals was also supported by the quantitative data analysis. Responses were collected from two 5-point-scale items that assessed sociability and success as group goals. Responses were then recoded to 3-point-scale items to obtain a clearer picture of the results (items: Q27.1_3scale, Q27.2_3scale). No strong or statistically significant correlations were found between the two variables (r (231)= .20, p = .760 > .05). However, the largest grouping of respondents ranked high on both sociability and achievement as group goals (45% of all players) (N = 233). Thus, instead of negating each other, the group goals sociability and achievement were integrated by a large percentage of the groups. In order to achieve these goals, groups establish appropriate rules, as described in the next section.

Group rules

In addition to the rules of the game, the players may establish their own rules, or etiquette, usually transferred from real-life ethos and values (Kücklich, 2008). From the qualitative data analysis, we identified two orientations for team rules: *social/affective* rules and *operational* rules. Furthermore, these rules appear to be consistent with the previously discussed group goals.

Social and affective rules are developed to regulate the social aspect, to control the members' behaviour, and to ensure good relations, communication, and cooperation among them. As mentioned above, a good social environment is one of the main goals of groups. Although different groups showed different degrees of tolerance and different thresholds for disruptive or quarrelsome behaviour, the general trend was that members who did not comply with the social behaviour rules would be marginalized or even expelled from the group:

> *I remember on one occasion, my guild had expelled somebody – and I had agreed to that – because of his foul behaviour. He was extremely rude, offensive, with very bad manners (WoW, Male, 29y).*

Good behaviour, cooperation, and good relations among the members were also among the main criteria for admitting new members. Of the survey respondents, 72% agreed that cooperation and good social behaviour were the main criteria for accepting new members into the group, whereas 33% agreed that a high virtual character level, good equipment, and knowledge of the game were prerequisites for joining the group (items: Q27.4, Q27.5).

On the other hand, *operational rules* are related to achievement. They are generally designed to achieve effective performance of group tasks and to ensure that the members commit to and participate in group activities. Although group membership provides a number of benefits to the members, it also entails certain obligations and responsibilities. For instance, members have to actively participate in group discussions and activities. The operational rules are meant to ensure that the members comply with these obligations and responsibilities. For example:

> *This tribe is a safe refuge for novice and expert players, for experienced and new members. […] after 4 wars and many obstacles we have managed to grow stronger. I will therefore ask all members to participate actively, and promptness is nonnegotiable for all the tribe's operations! (Message from the leader, in the TW tribe forum).*

Group structure

Structure is defined here as the existence (or not) of a leader, a ranking system, a hierarchy, and specifically assigned member roles. We distinguished two separate aspects of group structure: a) *design-based*, whereby the group organization is defined mainly by the design and affordances of the environment, the functionalities, and the virtual characters; and b) *player-defined*, whereby

the organization is not related to the design of the environment, but instead to the players' decisions and how the affordances are manipulated.

With respect to member role assignment, a *design-based structure* is governed by criteria that are related to the affordances of the environment, such as the virtual character's skills and the task requirements. For example, avatars with offensive powers and high resistance to enemy attacks would be assigned the "tank" role, and offensive avatars with lower resistance would support that tank. In contrast, a *player-defined structure* is governed by *social criteria*, where trust and friendship play the most determinant role. For example, a leader might select close and trusted friends as the "royal guards." On the other hand, *cognitive criteria* would be applied when role assignment is based on the players' knowledge, experience, and real-life skills, including communication, management, and organizational skills. In the TRIBAL WARS group, for example, a player who had good communication, writing, and interpersonal skills was assigned the "diplomat" role, and was responsible for negotiating with both friendly and enemy tribes. In another example, an interviewee who was a postgraduate student in computer science reported that he was in charge of website administration and management of the WoW guild.

The leader is generally assigned the most predominant role. Most of the interviewees stressed the importance of good leadership for group cohesion, effectiveness, and lifespan, as highlighted in the official game documentation:

> *The most important factors for any group-based combat are organization, leadership, and communication [...] Communication of these objectives and decisions from the leader, combined with succinct updates from the battlefield, hold the unit together and make it an effective fighting force (Lineage II Game Guides, 2013).*

An MMOG group leader has greater responsibilities than other members, including managing the group's resources, selecting or expelling members, delegating responsibility, monitoring group activity, coordinating group tasks, and negotiating terms of alliance, peace, or war with other groups. In some of the interviews, the leader's responsibilities and challenges were compared to those of a CEO or a company manager. Thus:

> *The game helps define leadership roles. In the workplace, you have a captive group of personnel under you. In an MMO you must keep together a group of people from all walks of life. You must be strong and at the same*

time you must be willing to hear what they have to say. You have to strike a fine balance (EVE Online, Male, 25-34y).

Leadership therefore requires not only game-specific skills and knowledge, but also cognitive, social, and interpersonal skills as well as certain real-life personality characteristics. Thus, the leader should have in-depth experience and knowledge of the game along with knowledge of the skills and potential of all the avatars. The leader should also be able to manage the group and the resources, coordinate the members, ensure discipline and good relations among the members, and ensure their satisfaction, motivation, and participation in group tasks. In addition, leaders must be able to communicate messages to group members, friends, and foes. In sum, leaders should be inspiring and effective. To do all this, they should be sufficiently free of real-life responsibilities to devote time to the game.

Relations among group goals, structure, and size

To investigate player group size, we used Williams et al.'s (2006) distinction between small, medium, large, and huge groups. Medium and large groups were the most common in our sample. Most of the survey respondents belonged to large groups of from 36 to 100 members (36%) or medium groups of from 11 to 35 members (32%), with 8% belonging to huge groups of more than 100 members and 14% belonging to small groups of fewer than 10 members (N = 206).

Further examination of the MMOG group profiles indicated a relationship between group size and group goals. The qualitative data analysis revealed a pattern: although, as discussed in the Group goals section, the achievement and social goal components co-existed in most groups, members of smaller groups appeared to prioritize a good social environment over achievement, whereas members of larger groups placed about equal emphasis on sociability and bonding, as well as achievement and success for group tasks. To illustrate, a member of a large, achievement-oriented group reported:

When the group has strong relationships and bonding, the members will not start blaming [the leader, for a failure]. [...] That is the difference between a good team and an inexperienced team (EVE Online, Male, 37y).

This observation was confirmed by the statistical analysis of the quantitative data. One-way ANOVA between group goals and size indicated statistically significant differences among group sizes for the *achievement* goal (F(3, 227) = 2.89, p = .036). The *sociability* goal showed no differences with respect to group size (F(3, 227) = 1.09, p = .353). Multiple comparison tests (least significant difference) for the variable *achievement* as a group goal indicated higher significance for groups with 36 to 100 members compared to groups with fewer than 10 members (-.527) and groups of 11 to 35 members (-0.304). Achievement was ranked higher by the 36-to-100-member groups compared to the latter two groups. This suggests that groups of 36 to100 members were more inclined to perceive achievement as their group goal compared to players in other groups.

Group goals and size were also related to group structure and organization. Large and achievement-oriented groups had a clearer and more strictly defined structure compared to smaller groups. Groups of real-life friends primarily wanted to enjoy themselves and have fun, and would rely mainly on a design-defined structure without introducing an additional strict ranking system. For instance, when asked in an interview about group structure and hierarchy, one experienced player in an achievement-oriented group said, "*Guilds are like an army. There is a hierarchy in the army*" (WoW and AoC, Male, 33y), whereas another expert player in a small group of four real-life friends responded to the same question, "*No [there is no structure or hierarchy]. We are all together and equals. Just like that*" (RAPELZ and L2, Male, 31y). This relationship between group size, structure, and rules was also found in the survey responses (items: Q25, Q27.3_3scale). The majority of the players in the 36-to-100-member groups (55%) agreed or strongly agreed that their group had a well-defined structure and rules, followed by 48% of players in groups of fewer than 100 members (48%), with only 18% for members of small groups with fewer than 10 members (x^2 (6)= 19.6, p = .003).

Similarly, the leader's role differed across groups according to group type, size, goals, and orientation. Thus, in the more social and less structured groups, where all members were equal, leadership was a formality: the most experienced player directed and coordinated the group. However, in more strongly structured groups with more clearly defined group task accomplishment goals, the leader had a well-defined, central role, which was associated with group effectiveness. From the interviews, members of moderately or strongly achievement-oriented teams showed a higher tendency to stress the importance of central control.

Decision making

The leader and group structure were found to be determinant factors for group decision-making practices. Based on the qualitative analysis, we identified two main aspects of the decision-making process**:** a) the need for *freedom of expression,* and b) the need for *centralized control,* including strong coordination and management. For example, decisions were frequently required to decide how the group would approach a task, whether or not members would be accepted or expelled, and whether and how to form alliances. In several instances, players emphasized the importance of centralized control, with a designated person to make decisions, provide direction, coordinate the members, and ensure discipline and compliance to the rules. In most cases, the leader was responsible for making final decisions. For example:

> *What really impressed me was the fact that guilds in Warcraft are not at all democratic, as a process, as power, the way it is distributed. And although in the beginning I didn't like it, I had some objections about the philosophy of it, mainly – why was it that we couldn't we be more democratic – in reality, the soul of the guild is the guildmaster (WoW, Male, 29y).*

Although these two aspects suggest two different types of governance, *authoritative* and *democratic*, in many cases this distinction is moot in MMOGs. Even in the more authoritative teams, the players felt that they had the right to express their opinion. If they felt that their rights were suppressed, if they weren't happy or motivated, they knew they could leave the group and find other groups that were more suitable for their attitudes and expectations:

> *I execute the orders as they must be executed, and when the whole process ends and we are all back to calm and normal, I'll go into the [communication] channel of the leader and I will explain to him [my objections] (L2, Male, 32y).*

In the survey questions on whether the leader makes the decisions and whether the members express their opinions during group decision-making processes, the players did not perceive these two questions as opposed. The largest percentage of players (31% of all respondents) agreed or strongly agreed to both decision making by the leader and the members' freedom of expression in decision making, versus 12% of players who ranked the leader's involvement as

low and the members' involvement as high, with only 9% ranking the leader's involvement as high and the members' involvement as low (items: Q27.8_3scale, Q27.14_3scale). This distribution of perceptions of group decision-making practices was statistically significant (x^2 (3)= 77.84, p= .001). Overall, the players felt that they were free to express their opinions and that these opinions would be considered by the leader, who was responsible for the final decision.

In-group communication

The differences in the dynamics between players within a same group and players outside the group are reflected in the communication tools they used. Group members used different tools to communicate with their own group members and with players outside the group. Communication among players, and specifically among members of a same group, was supported by a number of different communication channels and modes: synchronous chat, forums, voice, avatar animations, private group channels, alliance channels, channels for higher group ranks, and dedicated channels for trading items, end-game players, or new players.

Different communication channels can be used effectively for different tasks, and they also serve as media for the development of social relations. Players often used external, third-party applications if the game did not provide the communication tools they required. Both the LINEAGE II and TRIBAL WARS groups used external VoIP applications frequently to accomplish tasks and quests, where fast communication and coordination was required and every second counted. In order to develop plans and exchange ideas, in-game group forums provided a platform for discussion, where everyone could input their viewpoints and suggestions on their own time. On the other hand, when players needed to form a temporary, task-oriented group for a specific quest, the players were liable to be randomly selected, and did not always know each other. Therefore, even though fast coordination was required, voice communication did not appear to be common practice. Instead, they used synchronous chat. In this case, voice communication might have been considered more personal, and therefore reserved for friends or same group members.

In fact, this assumption was supported by the quantitative data. In our survey, we explored patterns of media use by players within and outside of their group, using several questionnaire items. The results indicated that in-game instant chat was the most frequent communication

medium for players both within and outside of groups, followed by voice communication, but only among same group members. Only use of animations received more responses from players outside the group compared to group members: 41% of players reported that they used animations for outside-group communication, versus 38% for within-group communication. Emails and phone calls were also used as communication media, mainly by same group members (Fig.1). Voice communication and media that can be considered more "personal," such as email and phone, were used mainly by same-group members, and the most commonly used tool among all players was in-game chat.
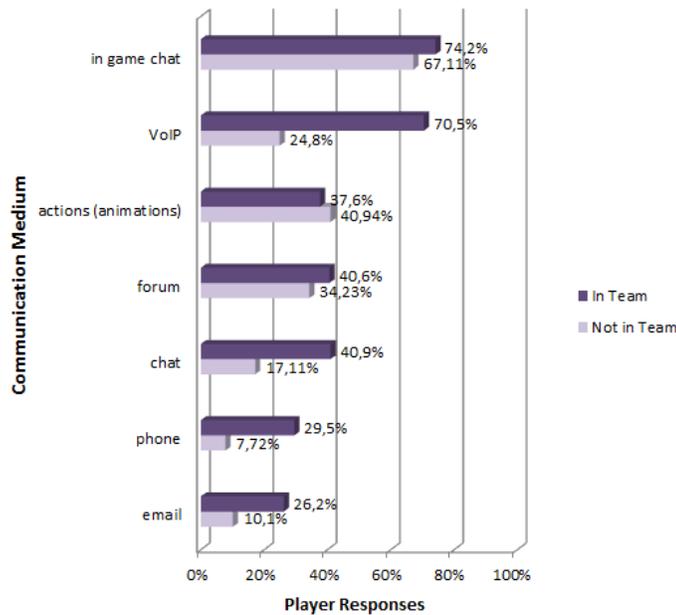

Figure 1: Communication media within and outside the group

Group profiles and player trajectories

Group profiles with respect to goals, size, structure, rules, and practices can also reflect what Williams et al. (2006) call "guild churn." Players do not necessarily remain in a same group throughout the course of a game. They may leave the group and join new ones, depending on their goals, motivations, and preferences. A general trend that emerged from our qualitative data analysis is that players start in smaller groups composed of real-life friends, social groups, or groups willing to invest time and resources in helping, supporting, and guiding novice players. Then, as players progress up the levels, they seek larger, more achievement-oriented groups. Finally, end-game players who have reached the highest level and explored most of the game content tend to adopt a more relaxed attitude. They move to medium- and smaller-sized groups,

where achievement is no longer the highest priority. They participate in group tasks, but they value sociability just as much. The survey responses captured this last part of the player trajectory. Most of the survey respondents remained in groups of similar size except for those who belonged to larger groups containing more than 36 members (items: Q25, Q26), where we observed a moderate shift to smaller-sized groups: 39% of players in very large groups with more than 100 members moved to a smaller group with from 36 to 100 members, and 35% of the players in groups with 36 to 100 members subsequently moved to smaller groups with 11 to 35 members. There were even a few cases (12%) of players who were previously in groups with more than 100 members and who subsequently moved to the smallest groups with 11 to 35 members. These shifts were statistically significant (x^2 (9)= 212.18, p = .001). Longitudinal studies and analyses of multiple players' log files would provide more accurate results on players' trajectories in terms of group type. Nevertheless, a trend emerged here, whereby players remained in similar-sized groups for a while and then shifted at some point from a larger to a smaller group. These player trajectories according to groups of different sizes and with different goals could reflect the progress and evolution of the players' gaming motivations, requirements, behaviours, and objectives.

Conclusion

In this study, we used a mixed method research design to explore and map practices and processes in MMOG groups, while considering both the design of the environment and the players' behaviours. We observed that although the environment provides the tools that largely define the formation of player groups, group sustainability and effectiveness depend primarily on the players' decisions and practices. Thus, through their practices and actions, the players themselves redefine the predefined environment in which they operate.

Two main factors for group cohesion emerged from the analysis: sociability and achievement. These appear to play a centralized role in group cohesion, goals, rules, and practices. The group's purpose and goals are associated with successful gaming, progress, and goal achievement, as are sociability, the social and affective environment, and interactions and relations with others.

Most aspects of group practices and processes can be defined by a combination of cognitive, social, and affective dimensions. Group structure is defined by the environment as well as the

players' social or cognitive criteria. For role assignment, criteria related to the design affordances and the avatar's skills and play level are considered, as well as social criteria and the players' cognitive and interpersonal skills. Leadership requires domain-specific skills along with real-life interpersonal, communication, management, and coordination skills, as suggested by Jang and Ryu (2011) and Lu, Shen, and Williams (2014). Communication within the group is critical for the social, affective, and achievement aspects of group life, and players select the appropriate communication tool for each task or purpose.

The features and orientations of the different types of MMOG groups provide useful insights into the players' gaming progress and the evolution of their gaming motivations, requirements, behaviours, and objectives. Throughout a given gaming trajectory, a player may switch between groups more than once. An examination of this trajectory could inform the construction of a model for the requirements, expectations, and progress of participants in similar virtual environments.

The effective integration of cognitive, social, and affective dimensions in a gaming system could facilitate the identification of MMOG features and principles that could inform the design of dynamic and effective collaborative learning environments. Of course, not all MMOGs or MMOG groups can effectively support cognitive, affective, and social dimensions. Nevertheless, good practices could be drawn from successful and popular MMOGs and transferred to collaborative learning environments in order to enhance learning in the sense of both knowledge acquisition and social experience.

References

Aarseth, E. (2003). Playing Research: Methodological approaches to game analysis. *In Proceedings of the Digital Arts and Culture Conference.*

ArenaNet. (2012). Guild Wars 2. NCSoft. https://www.guildwars2.com/en/

Ahmad, M. A., Huffaker, D., Wang, J., Treem, J., Kumar, D., Poole, M. S., & Srivastava, J. (2010). The Many Faces of Mentoring in an MMORPG. *2010 IEEE Second International Conference on Social Computing* (pp. 270–275). IEEE.

Avouris, N., Margaritis, M., & Komis, V. (2004). The effect of group size in synchronous collaborative problem solving activities. In *Proceedings ED Media AACE Conf., Lugano, June 2004* (pp. 4303–4306).

Barron, B. (2003). When Smart Groups Fail. *Journal of the Learning Sciences*, *12*(3), 307–359.

Bartle, R. A. (2003). *Designing Virtual Worlds*. New Riders Publishing.

Benefield, G. A., Leavitt, A., & Shen, C. (2016). Virtual Team Networks: How Group Social Capital Affects Team Success in a Massively Multiplayer Online Game. In Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing (pp. 679–690). ACM.

Blizzard Entertainment. (2005). World of Warcraft. Blizzard Entertainment. http://us.battle.net/wow/en/

Boekaerts, M. (2001). Context sensitivity: Activated motivational beliefs, current concerns and emotional arousal. In S. Volet & S. Järvelä (Eds.), *Motivation in learning contexts: Theoretical and methodological implications.* (pp. 17-31). Pergamon, Elsevier.

Carr, D., & Oliver, M. (2009). Tanks, chauffeurs and backseat drivers: competence in MMORPGs. *Eludamos. Journal for Computer Game Culture*, *3*(1), 43–53.

Carron, T., Marty, J.C., & Heraud, J.M. (2007). Teaching with game-based learning management systems: Exploring a pedagogical dungeon. *Simulation & Gaming*, *39*(3), 353–378.

CCP Games. (2003). EVE Online, CCP Games. https://www.eveonline.com/

Chen, M. G. (2008). Communication, Coordination, and Camaraderie in World of Warcraft. *Games and Culture*, *4*(1), 47–73.

Cohen, E. G. (1994). Restructuring the Classroom: Conditions for Productive Small Groups. *Review of Educational Research*, *64*(1), 1–35.

Creswell, J. W., & Clark, V. L. P. (2007). *Designing and conducting mixed methods research*. Sage Publications.

Creswell, J.W. (2002). *Research Design. Qualitative, Quantitative and Mixed Methods Approaches* (2nd ed.). Sage Publications.

Dickey, M. D. (2007). Game design and learning: a conjectural analysis of how massively multiple online role-playing games (MMORPGs) foster intrinsic motivation. *Educational Technology Research and Development*, *55*(3), 253–273.

Dillenbourg, P. (1999). Introduction: What Do You Mean By "Collaborative Learning"? In P. Dillenbourg (Ed.), *Collaborative learning: Cognitive and computational Approaches* (1st ed., Vol. 1, pp. 1–15). Oxford: Elsevier.

Ducheneaut, N., Yee, N., Nickell, E., & Moore, R. J. (2007). The life and death of online gaming communities: a look at guilds in World of Warcraft. *Conference on Human Factors in Computing Systems*, 839–848.

Freitas, S. D., & Griffiths, M. (2009). Massively Multiplayer Online Role-Play Games for Learning. In R. E. Ferdig (Ed.), *Handbook of Research on Effective Electronic Gaming in Education* (pp. 51–66). IGI Global.

Garrison, D., Archer, T., & Anderson, W. (1999). Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education. *The Internet and Higher Education*, *2*(2-3), 87–105.

Gibbs, G. (2007). *Analyzing Qualitative Data*. Sage.

InnoGames. (2006). Tribal Wars (Fyletikes Maxes) [MMORTSG]. Hamburg: InnoGames. Available at http://www.fyletikesmaxes.gr/

Jang, Y., & Ryu, S. (2011). Exploring game experiences and game leadership in massively multiplayer online role-playing games. British Journal of Educational Technology, 42, 616–623.

Järvelä, S. & Volet, S. (2004). Motivation in real-life, dynamic, and interactive learning environments: Stretching constructs and methodologies. *European Psychologist*, *9*(4), 193-197.

Karasabbidis, E., Komis, B., (2008). Synergasia kai mathese: Theoretika montela kai didaktikes proseggiseis [Collaboration and learning: Theoretical models and didactic approaches]. In Avouris N., Karagiannidis, Ch., and Komis, B. (Eds), *Synergatike Technologia. Systemata kai Montela Synergasias gia Ergasia, Mathese, Koinotetes Praktikes kai Demioyrgia Gnoses* (1st edition). Athena: Kleidarithmos, 11-39.

Korsgaard, M. A., Picot, A., Wigand, R. T., Welpe, I. M., & Assmann, J. J. (2010). Cooperation, Coordination, and Trust in Virtual Teams: Insights from Virtual Games. In W. S. Bainbridge (Ed.), *Online Worlds: Convergence of the Real and the Virtual* (pp. 253–264).

Kreijns, K, Kirschner, P. A., & Jochems, Wim. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: a review of the research. *Computers in Human Behavior*, *19*(3), 335-353.

Kücklich, J. (2009). A techno-semiotic approach to cheating in computer games or how I learned to stop worrying and love the machine. Games and Culture, 4(2), 158-169.

Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation* (Learning in doing: Social, cognitive and computational perspectives). Cambridge University Press.

Lineage II Game Guides, Player vs. Player Combat: Group Tactics. (2013). Last accessed December 3, 2013, at http://legacy.lineage2.com/guide/guides_pvp2.html

Lisk, T. C., Kaplancali, U. T., & Riggio, R. E. (2012). Leadership in multiplayer online gaming environments. Simulation & Gaming, 43(1), 133-149.

Lu, L., Shen, C., & Williams, D. (2014). Friending your way up the ladder: Connecting massive multiplayer online game behaviors with offline leadership. Computers in Human Behavior, 35, 54–60.

Mason, J. (2002). Linking qualitative and quantitative data analysis. In A. Bryman & R. G. Burgess (Eds.), *Analysing qualitative data* (2nd ed., pp. 89–110). London and New York: Routledge - Taylor & Francis.

Miles, M. B., & Huberman, A. (1994). *Qualitative data analysis: An expanded sourcebook. Analysis* (2nd ed.). Sage.

Nardi, B., & Harris, J. (2006). Strangers and friends: collaborative play in World of Warcraft. In *Proceedings of the 2006 20th anniversary conference on Computer supported cooperative work - CSCW'06* (p. 149). New York, New York, USA: ACM Press.

NCsoft. (2003). *Lineage II* [MMORPG]. South Korea: NCsoft

Oliver, M., & Carr, D. (2009). Learning in virtual worlds: Using communities of practice to explain how people learn from play. *British Journal of Educational Technology*, *40*(3), 444–457.

Pisan, Y. (2007). My guild, my people: role of guilds in massively multiplayer online games. In *Proceedings of the 4th Australasian conference on Interactive entertainment* (Vol. 305). Melbourne, Australia: RMIT University.

Ratan, R. a., Chung, J. E., Shen, C., Williams, D., & Poole, M. S. (2010). Schmoozing and Smiting: Trust, Social Institutions, and Communication Patterns in an MMOG. *Journal of Computer-Mediated Communication*, *16*(1), 93–114.

Riegle, R. P., & Matejka, W. (2006). The learning guild: MMORPGs as educational environments. In *Annual Conference on Distance Teaching & Learning*.

Roschelle, J., & Teasley, S. D. (1995). The construction of shared knowledge in collaborative problem solving. In C. E. O'Malley (Ed.), *Computer-Supported Collaborative Learning* (Vol. 128, pp. 69-197). Berlin: Springer Verlag

Saldana, J. (2009). *The Coding Manual for Qualitative Researchers*. Sage.

Sfard, A. (1998). On Two Metaphors for Learning and the Dangers of Choosing Just One. *Educational Researcher*, *27*(2), 4-13.

Steinkuehler, C. A. (2006). Why game (culture) studies now? *Games and Culture*, *1*(1), 97.

Turbine, Inc. (2007). The Lord of the Rings Online. Turbine, Inc., Midway Games, Warner Bros. Interactive Entertainment. https://www.lotro.com/en

Voulgari, I., Komis, V., & Sampson, D. G. (2014). Learning outcomes and processes in massively multiplayer online games: exploring the perceptions of players. Educational Technology Research and Development, 62(2), 245–270.

Williams, D., Caplan, S., & Xiong, L. (2007). Can You Hear Me Now? The Impact of Voice in an Online Gaming Community. *Human Communication Research*, *33*(4), 427–449.

Williams, D., Ducheneaut, N., Xiong, L., Zhang, Y., Yee, N., & Nickell, E. (2006). From Tree House to Barracks: The Social Life of Guilds in World of Warcraft. *Games and Culture*, *1*(4), 338–361.