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Jakob J. Assmann

Munich School of Management LMU Munich, assmann@bwl.lmu.de

Marcus A. Drescher

TUM School of Management, Munich University of Technology, drescher@tum.de

Julia V. Gallenkamp

Munich School of Management LMU Munich, gallenkamp@bwl.lmu.de

Arnold O. Picot

Munich School of Management LMU Munich, picot@lmu.de

Isabell M. Welpé

TUM School of Management Munich University of Technology, welpe@tum.de

See next page for additional authors

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Recommended Citation

Assmann, Jakob J.; Drescher, Marcus A.; Gallenkamp, Julia V.; Picot, Arnold O.; Welpé, Isabell M.; and Wigand, Rolf T., "MMOGs as Emerging Opportunities for Research on Virtual Organizations and Teams" (2010). *AMCIS 2010 Proceedings*. 335.
<http://aisel.aisnet.org/amcis2010/335>

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Authors

Jakob J. Assmann, Marcus A. Drescher, Julia V. Gallenkamp, Arnold O. Picot, Isabell M. Welpel, and Rolf T. Wigand

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Jakob J. Assmann

Munich School of Management
LMU Munich
assmann@bwl.lmu.de

Marcus A. Drescher

TUM School of Management
Munich University of Technology
drescher@tum.de

Julia V. Gallenkamp

Munich School of Management
LMU Munich
gallenkamp@bwl.lmu.de

Arnold Picot

Munich School of Management
LMU Munich
picot@lmu.de

Isabell M. Welp

TUM School of Management
Munich University of Technology
welp@tum.de

Rolf T. Wigand

University of Arkansas
at Little Rock, USA
rtwigand@ualr.edu

ABSTRACT

Massively Multiplayer Online Games (MMOG) offer new promising opportunities to research virtual organizations and teams. The characteristics of MMOGs allow researchers to obtain objective data from a large and multi-national population. Lasting over months or even years, MMOGs facilitate longitudinal studies and ensure a high involvement of participants. Moreover, collecting data from online surveys and game servers keeps the costs of MMOG studies low. In this paper, we illustrate how research in MMOGs can utilize these opportunities to overcome some limitations of traditional research environments. Further we discuss the diverse information and communication technology (ICT) usage in MMOGs and therefore argue that research in MMOGs can provide a glimpse into the future application of ICT in real life organizations.

Keywords

MMOGs, virtual teams, virtual organizations, ICT.

INTRODUCTION

The virtualization of economic and societal processes is an ever increasing phenomenon (Overby 2008). From an organizational perspective, this development is mainly driven by three major trends: First, the changing nature of the organizational environment. Second, the innovation potential of information and communication technologies (ICT). Third, the dynamics of work and society in general (Picot et al. 2008). As a consequence, formerly self-contained and hierarchically integrated structures are becoming more open and permeable by incorporating innovative forms of virtual work arrangements (Martins et al. 2004). Virtual teams are becoming the rule rather than the exception, as work processes, which were traditionally conducted through physical mechanisms, are increasingly being conducted electronically (Bell and Kozlowski 2002; Overby 2008). Furthermore, geographic dispersion is no longer a prerequisite for virtuality since co-located team members may also choose to employ virtual means for coordinating their actions (Kirkman and Mathieu 2005).

Research on virtual organization and virtual teams faces some of the same challenges that research on traditional organization and teams does: Field studies are typically small in scale and often lack quantitative or objective data. Laboratory studies, while allowing for large-scale, well controlled and rigorous quantitative data collection, involve relatively short-lived simulations in which the participants have little psychological investment. In addition to these limitations, researchers working on virtual organizations and teams have to deal with the rapid development of new ICTs and the innovative usage thereof by a tech-savvy generation of digital natives (Beck and Wade 2004). Single communication media cannot be analyzed by themselves or in comparison with one other medium anymore (e.g., email vs. instant messenger) but rather have to be considered as part of communication media repertoires (Watson-Manheim and Bélanger 2007).

The purpose of this article is to show, that Massively Multiplayer Online Games (MMOGs) as research environments offer a unique opportunity to study virtual organizational structures such as virtual teams. They have the potential to overcome some

of the limitations of previous research on virtual teams and therefore serve as a powerful extension of traditional research environments.

We begin by discussing the potential of MMOGs as research environments and illustrate how research in MMOGs can offset some of the limitations of research in traditional environments. Following we describe research example conducted by the authors in MMOGs. Finally, we integrate these insights and present their implications for future research.

MMOGS AS RESEARCH ENVIRONMENT

The emergence of MMOGs

In general, an MMOG is an online game usually played simultaneously by hundreds of players constituting a virtual world. A virtual world can be defined as a “synchronous, persistent network of people, represented as avatars, facilitated by networked computers.” (Bell 2008, p. 2)

Over the past few decades, MMOGs grew from relatively simple text based games with hundreds of players into complex 3D environments with millions of players. In this process, teams and organizations within these virtual worlds have become increasingly important for the gameplay, especially since EverQuest introduced the raid mechanic to the genre in 1999 forcing players to cooperate and coordinate their actions in order to be successful.

The social dynamics of these teams and other organizational structures have increasingly attracted the attention of scholars from many disciplines (Bainbridge 2007). Recently, researchers have begun to understand the potential of virtual worlds as research environments (Castronova and Falk 2008) for the study of organizational phenomena: They tremendously increase the number of participants, transcend socio-cultural boundaries and allow for collecting standardized data of social and economic interactions (Bainbridge 2007). In the following section we highlight how researching MMOGs offers new promising opportunities, previously undiscovered potential and how it expands the possibilities of social science researchers.

The opportunities of conducting research in MMOGs

Like traditional research environments, MMOGs can be used to conduct both, experimental and correlational studies. Below, we describe the most important opportunities in virtual team research using MMOGs.

One characteristic of MMOGs is that a broad variety of people are playing together and against each other in a virtual world. In contrast to common opinion, research shows that online gamers defy common stereotypes (Williams et al. 2008). Therefore, MMOGs offer researchers the opportunity to use research subjects from a much broader background (e.g., age, nationality, education, profession) than university students. This is a common limitation in many studies (Jarvenpaa et al. 1998; Jarvenpaa et al. 2004; Kanawattanachai and Yoo 2007; Sarker and Sahay 2003; Zhang et al. 2007) which reduces the extent to which findings can be generalized (Peterson 2001; Reips 2000).

Moreover, MMOGs tend to be highly engaging and psychologically meaningful to participants. Especially certain strategy games where teams compete against each other in pursue of a certain goal resemble the competitive dynamics to be found in the business world. Often the relationship between players is compared to the relationship between co-workers in their real jobs (Williams et al. 2006; Yee 2006). Therefore, few incentives are needed to motivate players. This presents a major opportunity since participants from studies with university classes usually receive incentives for their participation in experiments or surveys (most of the time credit points) (Heninger et al. 2006; Jarvenpaa et al. 1998; Kanawattanachai et al. 2007; Sarker et al. 2003).

Another advantage comes from the social dynamics within teams in MMOGs. The time investment of players in the formation, functioning and development of the team is quite comparable to that of the members of a real virtual work team. Also, the tasks fulfilled within the games are highly complex and sometimes comparable to the task complexity that is predominant in the context of virtual work teams and organizations in the real world (Kanawattanachai et al. 2007). As a result, online games are blurring the boundaries between work and play very rapidly and the activities performed in such games are increasingly similar to the work performed in business corporations (Yee 2006). Furthermore, in MMOGs, roles within teams can be self-allocated based on knowledge and experience rather than arbitrary assignment by an experimenter (Jarvenpaa et al. 1998; Kanawattanachai et al. 2007).

Teams in MMOGs usually play together for a long time. In contrast, laboratory studies for the most part have to manipulate ad hoc teams without future orientation or joint history, which can lead to a lack of commitment (Piccoli and Ives 2003) and influence team cohesion and performance (Zhang et al. 2007). Along with this temporary setting in lab studies, the examination of team development, alternating roles of team leaders (Wakefield et al. 2008), and interactions within the group

(Piccoli et al. 2003) over longer periods is limited. Depending on the game, teams in MMOGs play together for months or even years leading to high commitment among the members and strong team cohesion. Therefore, team development and alternating roles of team leaders can be studied here thoroughly.

In terms of size, teams in MMOGs vary strongly and range from small three player teams to highly structured organizations with hundreds of members. Furthermore, manipulation can be introduced at the organizational rather than just the team or the individual level. Some researchers even propose experiments at the societal level (Boellstorff 2008). These teams could even overcome the problem that sample and team size of virtual team studies are mostly rather small which constraints statistically confirmed results and generalizability (Bélanger and Watson-Manheim 2006; Majchrzak et al. 2000). Studies in MMOGs could answer the call for longitudinal data (Joshi et al. 2009; Malhotra et al. 2008; Piccoli et al. 2003; Raghuram et al. 2001; Webster and Wong 2008) allowing researchers to observe processes within teams, such as team formation, the formation of trust, and their influence on the teams' performance over time.

External effects can be controlled to a much greater extent in MMOGs than in field experiments, because these games are based on computer code which keeps the in-game environment constant over time. Furthermore, as field experiments often take place in companies, this environment also sets boundaries to manipulating participants (Malhotra et al. 2008). MMOGs, however, offer diverse opportunities for manipulations as discussed in the subsequent experiment section. In addition, most games have a built-in objective performance measure, substituting for flawed perceptual performance measures and avoiding possible common method variance (Majchrzak et al. 2005).

Another major opportunity is that MMOGs are played throughout the world. Hence, MMOGs allow researchers to conduct truly international and cross-cultural studies at very low cost. In traditional research environments the sample composition sometimes limits the possibilities for deducing differences between cultures (e.g., values and conflict resolution styles (Hertel et al. 2004; Wakefield et al. 2008). Teams from MMOGs could therefore reveal theoretical and practical implications improving (e.g., leadership of virtual teams with regard to cultural differences).

Finally, companies examined in field studies usually permit only a certain set of communication channels whereas MMOGs do not constrain the selection of ICTs. This allows players to use any communication media as well as to adjust the communication media repertoires to their specific needs. Hence, the usage of ICT in MMOGs provides researchers with extraordinary insight on what future organizational communication might look like.

To sum up, many MMOGs resemble situations of firms in competitive economic environments since they involve complex team building and team management over a longer period of time as well as the management of scarce resources and the race for achieving something that can only be reached by one or few actors, e.g. exploitation of a new market, winning an innovation race and the like. At the same time, the situation of MMOGs is better under control than strategic competition in the real world thereby allowing for the collection and alignment of subjective and objective data in surveys or experiments.

CONDUCTING RESEARCH IN MMOGS

The MMOG Travian

Following, we present a popular browser-based MMOG called Travian which we already used for conducting virtual team studies. The advantages of this game are manifold: first, it is playable without subscription fees or initial costs. Second, being browser based, no special client software is needed. Thus, the entry barrier for new and casual players is low. Moreover, Travian can be played on different country servers run in the native language of the specific country and international servers open for players from any place in the world. These factors provide for a broad user base making it particularly interesting and suitable for cross-cultural research by comparing countries one the one hand and multi-cultural teams on the other hand.

The game itself is a real-time strategy game. Players seek to gain natural resources, build armies, and expand their realms. Playing with up to 40,000 users on one server with scarce resources, actors soon find themselves in a social dilemma (Dawes 1980). The actors have to cooperate with others in order to protect their territory and to successfully expand their reach. In the race to dominate, actors form teams of up to 60 members under a leader or a leadership team. The game lasts approximately one year at which time one team is deemed the winner based on the fastest completion of a building called "Wonder of the World". Teams are equipped with a shared forum, a chat room, an in-game messaging system. Furthermore, players can use all types of external communication media (e.g., self-administered forums, Skype). The leadership of a team can invite further members or dismiss current members. Like virtual teams at work, teamwork and negotiation skills play a crucial role in this context.

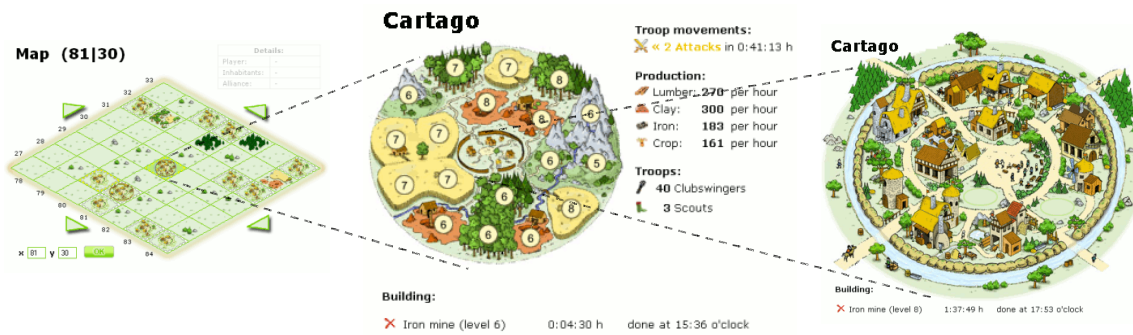


Figure 1. The virtual world of Travian

Experiments in MMOGs

MMOGs offer great potential to conduct experiments. Depending on the extent of interventions granted by the game provider, researchers can manipulate the entire game world. This section illustrates two possible concepts showing how to implement manipulations in a game context and gives an example realized by the authors.

First, given the possibility to alter game code, researchers could manipulate all game processes. For instance communication: by providing certain communication channels exclusively to subpopulations researchers could analyze the impact of communication media (mixes) on several dependent variables like performance or trust. This provides the opportunity to examine e.g. media usage, media efficiency or communication content in a long-term virtual environment which usually is neither possible in laboratory experiments because of time restrictions nor in field studies since companies do not allow to disadvantage groups of employees. Second, manipulations can be introduced by task assignment; both game related and unrelated, fostering certain behavior. The embodiment of tasks is at the discretion of the researcher. Tasks can refer to single players, teams or the whole game world. Further, the duration of tasks is scalable according to the manipulations' needs: from single action tasks to assignments lasting over weeks or months.

The latter concept was used in a series of experiments conducted on an international Travian game server. The server lasted five months with about 6.000 players and 120 teams from 30 nations. The game world was clustered into three geographic sectors after six weeks when teams were established and stabilized. In each sector, teams were assigned to manipulations, namely coordination, cooperation, and communication. For example, teams in the coordination manipulation had to attack certain villages. In the low coordination condition, team members solely had to attack five separate villages once per day. In contrast, the high coordination condition expected that at least 30% of the team members manage to attack each of the five villages within a timeslot of 60 seconds once per day. Depending on the geographic distance, troop speed and team size this task required high coordination efforts of the teams and their leadership. After the five day manipulation period, all teams were exposed to a trust manipulation leading to the final task after day six, a public goods game with a threshold depending on team size. Additionally, all in-game interactions of the players stored in the server log-files (e.g., in-game communication, attacks, and trade) were tracked over the full duration of the server. The combination of experimental data, server log-files and survey data provides a powerful instrument for researchers. It allows them to analyze experimental data with unobtrusively measured ratios and to observe the long-term development of manipulated teams. Of course, such experimentation has to meet all requirements of ethical research including that subjects must be at least 18 years old and that they receive an adequate debriefing.

Correlational studies in MMOGs

MMOGs offer some great opportunities for correlational studies. First, combining survey data and log-files (e.g., objective individual and team performance) avoids possible common method variance. Second, server log-files can be used to derive structural data necessary for statistical analysis like hierarchical linear modeling (HLM) or social network analysis (e.g. team membership, player interaction). Third, the log-files offer the opportunity to track the development of individuals and teams precisely over time and thereby allow researchers to conduct longitudinal studies. As an example, Picot et al. (2009) use survey data combined with structural log-file information in an HLM to examine the antecedents and consequences of trust of team members in virtual team leaders.

DISCUSSION AND IMPLICATIONS

This paper set out to illustrate the potential of MMOGs as environments for empirical research. By identifying some of the major advantages of conducting research in MMOGs we showed how these innovative environments can complement traditional research environments.

Research using MMOGs somewhat bridges the gap between laboratory studies and field studies regarding internal and external validity. For instance, findings from laboratory studies can be tested in MMOGs in a more general way. Vice versa, lab designs allow to confirm results obtained from MMOGs in a more controlled environment. Likewise, MMOGs offer the opportunity to test results from field studies in an environment that provides more control. Yet, it still includes a broad part of society as possible participants. Inversely, field studies constitute a research design that can potentially confirm findings obtained in MMOGs enhancing generalizability.

However, using MMOGs as research environments is still in its early stages. The log files of these games could create thousands of potential variables (e.g., (Webb et al. 1966)). Many other metrics need to be developed. Combining them with survey data or experimental stimuli bears the potential lead to a major realignment of social sciences. (Castronova et al. 2008). Research shows that the social processes within teams can be linked to rankings of the games. This temporal separation of different data points by days, weeks or even months is possible not only in Travian but in almost all MMOGs, such as EverQuest II or World of Warcraft.

These games are played all over the world. Travian even emphasizes this practice and runs servers in around 50 countries in the local language. Therefore, cultural effects can be explored on a national level first. Building on these results the international server can be used to explore any deviances from the national characteristics once a player is exposed to a multinational team.

Furthermore, by studying the usage of ICT in virtual teams within MMOGs it is possible to derive implications for future ICT usage in companies. In MMOGs, players range from newbies to highly experienced computer experts. As shown in the example, the appropriate choice of communication media, whether new or established, is critical to efficient team processes. In an ongoing process, teams with varying experience in ICT include new developments in their communication media mix. Foremost, tech-savvy players are the first to try out new communication applications. Applications that turn out to be superior, replace traditional technologies and are incorporated into the communication media repertoire. In contrast to companies, the context of MMOGs allows virtual teams to experiment with new ICT developments without taking too much risk (Reeves et al. 2008). After the selection process of new technologies by experts, less experienced players begin to use the new applications. This process, however, determines the future success of the technology. If a new channel turns out to be unable to transport information accurately or lacks usability for less tech savvy players, it will be rejected by the community. Hence, the band-width of experience with ICT of players in MMOGs allows researchers to observe the early adoption of new ICT media as well as its diffusion in the community. Thus, findings obtained in MMOGs give practitioners valuable insights in application areas of new ICTs, e.g., which communication channel(s) is (are) appropriate for which kind of information transfer, or which team size.

Apart from the adoption process, players of MMOGs constantly search for new ways to share and conserve information. If nothing appropriate is available, they develop new tools in order to process and transfer information efficiently. In case of Travian, several online platforms emerged around the game (e.g., <http://gettertools.com/>). These platforms give players the opportunity to comprehend the enormous amount of public information available. Additionally, they provide the opportunity to track and coordinate team members' actions. By analyzing the emergence and the functionality of platforms around MMOGs, researchers can reveal practical implication for the usage and implementation of innovative ICT solutions in companies which can enhance efficiency in knowledge sharing and reduce cost at the same time (Bughin 2008).

As with any research environment, there are some limitations which have to be considered. Even though gamers playing MMOGs develop a strong psychological involvement with the game, taking risks in the game essentially leads to fewer consequences than taking comparable risks in the real world. This fact yields the most serious limitation of MMOGs as a research environment, thereby reducing the extent to which obtained results can be generalized. However it is worth noting that the long term orientation of MMOGs strengthens the participants' engagement to succeed in the game. This improves the experiment's subjects commitment compared to laboratory studies.

Furthermore, hierarchies within MMOGs differ from real world virtual team hierarchies. While globally dispersed teams within or between companies usually have clearly defined formal authorities, teams in MMOGs usually do not; in case of conflict, players can usually change team membership with one mouse click.

An additional concern is the honesty of the players within an MMOG. First, it is hardly possible to verify socio-demographic data. All the information they choose to disclose can be deliberately false. For instance, sometimes players even choose to switch their “online” gender (Huh and Williams in press). Second, players could try to cheat in the game to achieve an advantage over competing players and therefore potentially distort the collected log file data. Yet, MMOGs usually have very strong communities of honest players. Supported by incentives from the developers of MMOGs, players usually “police” their own game and report any suspicious activity. In *Travian*, so called “Multihunters” are recruited from the game’s community and trained to identify cheaters.

Another limitation might be that players of MMOGs do not necessarily represent the society as a whole because the social composition of these games is often biased (Kendall 2002; Nakamura 2009). Depending on the MMOG the bulk of players is usually predominately male. Yet, as the gaming industry is trying to develop new markets, games which specifically cater to the demands of female players will in the future potentially mitigate this limitation. Furthermore, most MMOGs need advanced hardware as well as a fast and stable internet connection, which restricts access almost solely to computer experienced players from countries with a decent Internet infrastructure. However recently, the gaming industry has been developing browser based games, both “simple” html-/php-based and sophisticated flash-based 3D games. Thereby, less tech-savvy people from countries with less advanced infrastructure acquire the opportunity to participate in those virtual worlds.

The access to MMOGs is limited not only for players but far more severely for researchers. For the most part, scholars depend on the cooperation of providers of MMOGs to grant them access to their data and players. Even if a developer of an MMOG grants full access, the research design is still bounded by the game design of the examined MMOG. To date, researchers have not succeeded in developing an MMOG which caters to the need of researchers and establishes a committed player community at the same time to ensure the players’ long time personal and emotional involvement.

CONCLUSION

Future research may build upon our argumentation and fully explore MMOGs as research environments. If researchers gain access to communication logs, advanced tools are needed to automatically categorize the content of these messages, code it and finally analyze it. Furthermore, the use of ICTs in MMOGs to cooperate and coordinate team efforts offers an intriguing opportunity.

In conclusion, as almost all work becomes virtual to some degree, the influence of virtuality on human behavior will continue to be on the research agenda of various academic disciplines. Research on the effects of the virtualization of organizational structures, on social dynamics, and on decision processes has made great progress in recent years, yet many questions are left unanswered. We firmly believe that research in MMOGs and other virtual worlds will help to answer some of these questions.

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