Do Good Gamers Make Good Students? 
Sid Meier’s Civilization and Performance Prediction 
Research-in-Progress

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Abstract

Civilization is a popular series of turn-based strategy video games. The game is broad, so it confronts players with high complexity. Dealing with this complexity requires good analytical skills, but interpersonal skills are likewise important. These and similar skills are also relevant in the job market, especially for managerial positions, so the question arises whether Civilization can predict business managers’ performance. To explore this possibility, we conducted a series of multiplayer games with forty business students. While we cannot yet present data related to their job performance, this research-in-progress paper provides first evidence of a significant relationship between game performance and academic performance. Our future research will explore the participants’ analytical and interpersonal skills and how these skills are related to success in the game in order to show whether and how well strategy video games may also predict job performance and, as such, support personnel evaluation and selection.

Keywords: Civilization, Gamification, Performance prediction, Personnel selection
Introduction

_Civilization_ is a long-standing series of turn-based strategy video games, many of which Sidney K. “Sid” Meier produced (www.civilization.com). The _Civilization_ series has been successful since its beginnings in the 1990s (Owens 2011), and it has had a significant influence on contemporary video gaming. With millions of copies sold and multiple awards won—the opening theme of _Civilization IV_ even awarded a Grammy—_Civilization_ is considered one of the best, if not the best, turn-based video games of all time (Metacritic 2015).

In playing the _Civilization_ games, players take turns performing activities like moving their units, constructing buildings in their cities, and trading with other civilizations. Although simple, the game is broad, as it offers virtually endless possibilities, so it confronts players with high levels of complexity and uncertainty. Dealing effectively with multifaceted and deeply connected game mechanisms like economics, science, culture, and religion—along with the high number of available units, buildings, and resources—requires good planning, organization, and problem-solving skills. In the multiplayer mode, players must also interact with each other, either cooperatively (e.g., diplomacy, trading, and research) or competitively (e.g., war, espionage, and embargoes), so interpersonal skills are likewise important.

Skills like problem solving, planning, and negotiation are also useful in the job market, especially in managerial roles. Therefore, the question arises whether _Civilization_ may predict business managers' performance, and as such, support personnel evaluation and selection. We organized a series of multiplayer games with business students to explore this possibility by comparing, as a starting point in a larger study, the participants' game results with their academic performance. Grades are often used in personnel recruiting for the selection of applicants (e.g., Carlson et al. 2002; Reilly and Warech 1994), but whether and how significantly grades are related to job performance remains controversial (e.g., Bretz 1989; Cohen 1984). Against this background, this research-in-progress paper only provides preliminary evidence for _Civilization's_ potential as a personnel-selection tool, so it also outlines our plans for collecting and analyzing job-related performance data in the future.

The next section explains the skills that are usually deemed relevant in the job and discusses to what extent grades reflect these skills. Then, we introduce _Civilization_ and argue that many of its game principles require the skills that business students and managers are typically expected to have. Next, we explain how we organized the multiplayer games with the students and present results from a comparison of the participants' game results with their academic performance. After discussing the results, we outline our plans for future research and discuss the potential implications of our work from the viewpoint of information systems (IS) research.

Background

The history of personnel-selection research reaches back to the first decade of the twentieth century (Ghiselli 1973). Since then, various methods for predicting future job performance and evaluating and selecting personnel have received attention from researchers, including general mental ability tests, work sample tests, interviews, job knowledge tests, peer ratings, and assessment centers (Schmidt and Hunter 1998). The validity of these methods has been compared in several meta-analytical studies (e.g., Hunter and Hunter 1984; Reilly and Chao 1982; Schmitt et al. 1984), but the results have often differed because data-collection procedures, organizational settings, and especially sample sizes varied among the studies reviewed (Hunter and Hunter 1984; Schmitt et al. 1984).

Many companies use grades in personnel-selection processes, as they can easily be compared and provide a condensed account of an applicant’s academic history (Reilly and Warech 1994). However, grades reflect past academic performance and may not always predict future job performance, so there are also companies that do not use them. For example, Goldman Sachs and Johnson & Johnson use grades in personnel recruiting, while Google thinks they have only little predictive power, especially in the long term (Nisen 2015). Still, grades are common in hiring, so they have been studied by many human-resource researchers (e.g., Cole et al. 2003; Imose and Barber 2015; McKinney et al. 2003; Roth and Clarke 1998).

While some researchers have questioned the predictive power of grades (e.g., Bretz 1989; Cohen 1984), others have found that they are at least somewhat related to job performance (e.g., Dye and Reck 1989;
Roth et al. (1996). For example, Hoyt (1965) early presented evidence that grades bear little or no relationship to adult accomplishment, while Cohen (1984) later found small, though consistently positive, correlations between college grades and various criteria of adult achievement. More recently, Roth et al. (1996) concluded that grades and job performance are more closely related, while Pfaff and Fong (2002) found no relationship between grades and career success, in part because there was little variation among the grades of their sample of MBA students. Although Waldman and Korbar (2004) reconfirmed the validity of grade point average as a salary predictor, research overall has suggested better ways to evaluate and select personnel.

Even so, grades may predict job performance, as they, at least to some extent, reflect many skills that are typically deemed important on the job (Waldman and Korbar 2004). Study programs are designed to prepare students for future work, so they usually convey a broad variety of skills (Fallows and Steven 2000; Ibáñez et al. 2014). In fact, in addition to the main criterion of subject knowledge, procedural knowledge and skill play a major role in today’s university education (McCloy et al. 1994), and they are also subject of most accreditation programs (Shuman et al. 2005). To a good extent, grade point averages reflect the level of mastery of skills outside the technical dimension, including analytical skills like problem solving and decision making and interpersonal skills like communication and teamwork (Beard et al. 2008; Crebert et al. 2004; Fallows and Steven 2000; Ibáñez et al. 2014; Shuman et al. 2005).

The next section explains that these and related skills correspond to those that are important in playing Civilization.

Civilization

Sid Meier and Bruce Shelley created the first Civilization game for MicroProse in 1991. Since then, four sequels and various expansion packs and add-ons have been released. Civilization is a turn-based strategy game, somewhat like chess (Squire and Steinkuehler 2005), that has been recognized as one of the best turn-based video games of all-time. Most video-game rankings include one or more Civilization titles among their top ten strategy games (Owens 2011). The series has won many prizes, including several game-of-the-year awards, and it recently reached 29 million units shipped (Makuch 2015). The current flagship of the series is Civilization V.

The idea of the game is to build a civilization from scratch, from the ancient era to the modern age, which requires players to expand and protect their borders, build new cities, develop their infrastructures, discover novel technologies, maintain economies, promote their cultures, and pursue preventive diplomacy. Including all downloadable content and two expansion packs, Gods & Kings and Brave New World, forty-three civilizations are currently available in Civilization V. These civilizations span from America and Arabia to Venice and Zulu, and each offers unique gameplay advantages. The world differs in each game, with differing geography, terrain, and resources. In the course of the game, players have to explore their world—that is, uncover the randomly generated map—to find new resources, suitable locations for founding cities, and the other civilizations’ territories. Figure 1 shows two screenshots that illustrate the gameplay.

There are four main types of victory in the game—domination, science, culture, and diplomacy—so Civilization offers a wide array of possibilities. Players can recruit more than 120 military units (e.g., archers, warriors, and nuclear missiles) to achieve a domination victory; research 81 technologies (e.g., mining, biology, and nuclear fusion) in several eras (e.g., the ancient, medieval, and atomic eras) for the science victory; use 45 social policies (e.g., humanism, philanthropy, and reformation) and three ideologies (freedom, order, and autocracy) with 16 tenets each to support the cultural victory; and seek allies among various city-states (e.g., Zurich, Prague, and Hanoi) of differing types (e.g., religious, mercantile, and maritime) for the diplomatic victory. If no player has achieved one of these four types of victory before the year 2050, the player with the highest score wins the game (time victory). Players must also be balanced, as weakness in any area can weaken other areas. As Camargo (2006, n.p.) explained:

[T]he strategies in winning, whichever conditions the player might choose, are intricate and manifold. If a player attempts a military victory, he/she still needs to keep up scientific research, or the units will become obsolete. A strong economy must be maintained or the player won’t be able to support all of the military units. A variety of cities are necessary to build units, but cities not only require maintenance, they also need
to be defended from enemies. Regardless of what path the player chooses, an appropriate balance must be struck. Within this framework, there are many options for the player to explore.

Compared to other video games, the variety of ways to win make Civilization an unusually broad and open game, such that even the central game elements—terrain features, resource types, buildings, religion, happiness, espionage, trading, archeology, wonders, promotions, specialists, great people, barbarians, and many more—cannot be explained concisely. (Visit civilization.wikia.com for more information.) However, this broad overview should provide some sense of the game’s complexity. Winning requires players to develop balanced strategies and to adapt (or even switch) them proactively and reactively.

Civilization’s considerable complexity and uncertainty require careful planning and analytical skills. The need for interpersonal skills may be less obvious, but they are important in the multiplayer mode. Civilization supports both cooperative and competitive strategies, so negotiation skills are essential to success in the game. While various game principles (e.g., embassies, declarations of friendship, open border or research agreements, and defensive pacts) support cooperation between players, other game principles (e.g., war, espionage, embargos, and missionary work) make the game competitive. Players cooperate and trade with each other to get new resources and borrow money. At the same time, they compete for scarce resources, city-states, wonders, and other things, so conflict is unavoidable.

Figure 1. Civilization V screenshots

Against this background, we expect “hard” skills (e.g., planning and organization, problem solving) and “soft” skills (e.g., communication, negotiation) to affect performance in the game—skills that largely correspond to those the academic literature deems important in the job. Accordingly, Civilization may predict job performance and so it could be used for personnel evaluation and selection. As the next section explains, we have started to explore this possibility by organizing multiplayer games with business students and comparing their game performance with their academic performance.

Study Design

Participants. Forty business students, as future managers an ideal sample for our study, volunteered to participate. We promoted the research project in lectures and via e-mail and offered as an incentive to participate the chance to win any of six prizes in a lottery (three tablet computers, a notebook, an e-book reader, and a Civilization board game). Shortly after a student responded, we informed him or her via e-mail about the conditions of participation and provided copies of the game. Participating students had one month to learn how to play Civilization—a challenge, as becoming competent in the game required an average playtime of more than twenty-five hours. As a result, ten other students who applied for the study withdrew, citing time constraints.

Table 1 provides descriptive statistics for the participants. Participants from 19 to 46 years took part in the study, and thirty of the forty participants were male. The participants’ Civilization V playtime—which we were able to measure because all of them became our “friends” on Steam, a software distribution platform—ranged from 3.80 to 260.30 hours, with an average of 33.40 hours and a standard deviation of 39.25 hours. The participants’ self-estimated experience with other Civilization titles (e.g., Civilization I-
IV, Beyond Earth] ranged from 0 to 200 hours. They reported spending an average of around 4 hours per week on video games (often action, sports, and strategy games).

Twenty-three participants were undergraduate business-administration students, while the remaining seventeen were in business-oriented Master’s programs at the graduate level. We also assessed if the participants had part-time jobs or conducted studies abroad, which both may have influenced their academic performance. Ten participants had spent time abroad during the course of their studies (overall, 0.30 semesters on average), and 60 percent of them had part-time jobs.

<table>
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<th>Variable</th>
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<th>Obs</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
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<td>4.08</td>
<td>5.54</td>
<td>0.00</td>
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<td>Civilization V playtime</td>
<td>(hours)</td>
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<td>33.40</td>
<td>39.25</td>
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<td>260.30</td>
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<td>Experience with other Civilization titles</td>
<td>(hours)</td>
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<td>23.90</td>
<td>54.09</td>
<td>0.00</td>
<td>200.00</td>
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<td>0.43</td>
<td>0.50</td>
<td>0.00</td>
<td>1.00</td>
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<td>Studies abroad</td>
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<td>0.61</td>
<td>0.00</td>
<td>3.00</td>
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<td>Part-time jobs</td>
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<td>0.60</td>
<td>0.50</td>
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Table 1. Participants' descriptive statistics

**Procedure.** Between March and April 2015, we organized ten four-hour multiplayer games, each with four participants. The games were run as permanently supervised LAN games in a computer lab, where we had pre-installed Steam and Civilization V. Because we could not rule out the possibility that participants would know each other personally, we ensured they could not identify each other during the game, as their doing so could result in their teaming up against players they did not know. Therefore, the participants were randomly assigned to groups and were required to use pre-installed, anonymized Steam accounts and user names. In addition, their workstations were surrounded by whiteboards, so they could not see each other’s screens, and they were not to speak aloud to each other. Participants also wore head-phones, so they could not hear (and possibly identify) each other when they were typing in the game’s chat window (Figure 2).

Figure 2. Physical layout of the multiplayer games

The participants were informed about the game setup via e-mail before the gaming sessions started. All participants played the Washington civilization to ensure that they had equal benefits and because America’s bonuses are not useful in a four-hour game. To rule out potential AI biases, there were no computer players, and the “Pangaea” map type was selected, so all players shared a single, huge landmass. The difficulty level was set at “emperor” to make the game challenging, the game pace was set to “quick” to account for the short gaming time, resource distribution was “balanced” to make geography as fair as possible, and the turn timer was enabled to prevent players from delaying the game. In addition, the map size was “tiny,” the four main types of victory were enabled, movement and combat were set to “quick,” and down-
loadable content—except for Gods & Kings and Brave New World—was disabled. All other settings (e.g., game era, world age, number of city-states) were standard. We tested this set-up in three one-day LAN games, each with at least four unique players.

**Measures.** It is nearly impossible to achieve any type of victory other than the domination victory within a four-hour game, so we measured game success based on the participants’ final Civilization scores. These scores, which are automatically calculated by the game, are a function of several factors, each with its own weighting, that reflect economic, scientific, cultural, and military progress (e.g., the number and size of cities owned, technologies researched, wonders built, and the amount of land controlled and gold possessed). To ensure the participants would try to collect as many points as possible, the winner of the first prize was drawn among the ten participants who earned the highest scores in the multiplayer games.

All games were of equal length, but the number of turns the groups took varied with their game pace (e.g., war slowed the game down in some groups). To allow group comparisons we calculated the participants’ mean points per turn as:

$$\text{Mean points per turn}_i = \frac{\text{Total points}_i}{\text{Turns}_i_j},$$

where $i$ indexes the individuals, and $j$ indexes the groups.

Participants were graded according to the Swiss grading system, with a lowest possible grade of 3.0 (“insufficient”), a highest possible grade of 6.0 (“excellent”), and grades rounded in 0.5 increments. Their academic performance was measured as the product of their grade point averages and study progress during the last two semesters (if possible; some of the participants were freshmen):

$$\text{Academic performance}_i = \text{Grade point average}_i \cdot \frac{\sum_k ECTS_{i,k}}{30 \cdot S_i},$$

where $ECTS_{i,k}$ indicates the credit points earned by an individual $i$ in course $k$, and $S_i$ is the number of an individual’s semesters of study. (Students are expected to earn 30 ECTS per semester.)

**Results**

Table 2 shows the participants’ game results and study results. The participants’ Total points in the game (i.e., their final scores) ranged from 213 to 1,291, with a mean of close to 700 points and a standard deviation of around 246 points. The number of Turns the groups took ranged from 131 to 205, with a mean of around 165 turns. The participants’ Mean points per turn averaged 4.20 and, with a standard deviation of 1.30, ranged from 1.28 to 6.62.

<table>
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<tr>
<td>Turns</td>
<td>(abs. number)</td>
<td>40</td>
<td>165.20</td>
<td>23.00</td>
<td>131.00</td>
<td>205.00</td>
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<tr>
<td>Total points</td>
<td>(abs. number)</td>
<td>40</td>
<td>698.80</td>
<td>246.28</td>
<td>213.00</td>
<td>1,291.00</td>
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<tr>
<td>Mean points per turn</td>
<td>(see text)</td>
<td>40</td>
<td>4.20</td>
<td>1.30</td>
<td>1.28</td>
<td>6.62</td>
</tr>
<tr>
<td><strong>Study results</strong></td>
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<tr>
<td>Credit points</td>
<td>(ECTS)</td>
<td>40</td>
<td>42.24</td>
<td>15.45</td>
<td>6.00</td>
<td>72.00</td>
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<tr>
<td>Grade point average</td>
<td>(Swiss grading)</td>
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<td>4.84</td>
<td>0.40</td>
<td>4.00</td>
<td>5.83</td>
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<td>Academic performance</td>
<td>(see text)</td>
<td>40</td>
<td>4.11</td>
<td>1.28</td>
<td>0.80</td>
<td>5.83</td>
</tr>
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</table>

**Table 2. Game and study results**

The total number of Credit points the participants earned during the last year varied from 6 to 72, with an average of around 42 credits. Grade point average, calculated based on ECTS credits, ranged from 4.00 to 5.83. We were not able to obtain study data for three participants, so we estimated the missing values...
using available observations for regression analysis. The Academic performance mean of all participants was 4.11, with a standard deviation of 1.28.

To estimate the relationship between Mean points per turn and Academic performance we calculated two linear regression models. Our first model is specified as:

Model 1: \[ \text{Academic performance}_i = \beta_0 + \beta_1 \cdot \text{Mean points per turn}_i + \varepsilon_i, \]

where \( i \) indexes the individuals, \( \beta_0 \) is the intercept, \( \beta_1 \) is the effect of Mean points per turn, and \( \varepsilon_i \) is an error term.

Our second regression model adds the control variables Civilization V playtime, Experience with other Civilization titles, Gaming habits, Age, Gender, Study level, Studies abroad, and Part-time jobs:

Model 2: \[ \text{Academic performance}_i = \beta_0 + \beta_1 \cdot \text{Mean points per turn}_i + \gamma' \cdot \text{Controls}_i + \varepsilon_i, \]

where Controls\(_i\) represents the control variables.

Table 3 shows that both models suggest game performance and academic performance are positively related: Model 1 shows a significant (0.335; \( p < 0.031 \)) relationship between Mean points per turn and Academic performance, and Model 2 confirms this effect (0.307; \( p < 0.060 \)), and Age (-0.079; \( p < 0.087 \)) and Study level (1.319; \( p < 0.006 \)) also become significant.

<table>
<thead>
<tr>
<th>Dependent variable: Academic performance</th>
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<th>(2)</th>
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<tbody>
<tr>
<td>Mean points per turn</td>
<td>0.335 * (0.150)</td>
<td>0.307 † (0.157)</td>
</tr>
<tr>
<td>Civilization V playtime</td>
<td>0.007</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Experience with other Civilization titles</td>
<td>0.003</td>
<td>(0.004)</td>
</tr>
<tr>
<td>Gaming habits</td>
<td>0.044</td>
<td>(0.044)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.079 † (0.045)</td>
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</tr>
<tr>
<td>Gender</td>
<td>0.465</td>
<td>(0.577)</td>
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<tr>
<td>Study level</td>
<td>1.319 ** (0.445)</td>
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</tr>
<tr>
<td>Studies abroad</td>
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<td>Part-time jobs</td>
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<td>(0.442)</td>
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<tr>
<td>(Intercept)</td>
<td>2.699 *** (0.657)</td>
<td>3.337 * (1.587)</td>
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<td>40</td>
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<tr>
<td>( R^2 )</td>
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<tr>
<td>Adj. ( R^2 )</td>
<td>0.094</td>
<td>0.211</td>
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<td>F Statistic</td>
<td>5.032 * (df = 1; 38)</td>
<td>2.161 † (df = 9; 30)</td>
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</table>

Notes: † \( p < 0.1 \), * \( p < 0.05 \), ** \( p < 0.01 \), *** \( p < 0.001 \). Standard errors are in parentheses.

Both models show a significant and positive relationship between game performance and academic performance, so they confirm that Civilization may be used for performance prediction—an opportunity we discuss in the next section.

\[ \text{Table 3. Regression results}^1 \]

\(^1\) Other than gaming habits, which correlated with gender and study level, none of the control variables were significantly correlated. In addition, all variance inflation factor values were smaller than 2, which is below the critical threshold of 10, so there were no concerns of multicollinearity. We tested for the assumption of independence of errors using a Durbin-Watson test, and there were no problems with autocorrelation (Durbin-Watson value: 1.54; \( p > 0.116 \)).
Discussion

While our study revealed a significant relationship between the participants’ game performance and their academic performance, our early-stage research features a small sample size and a somewhat simplistic measurement methodology. For example, age and study level, two effects that would likely disappear in a similar study with a larger sample, were significant. Still, we believe our results, though only preliminary, provide first evidence that strategy games like Civilization may be useful in performance prediction and, as such, personnel evaluation and selection.

As participation was voluntary, one may argue personality-related characteristics, such as a high level of interest in gaming, could have influenced the results through selection bias. However, the lottery prizes, which most students cannot afford easily, were attractive to all participants, not just gamers, the previous Civilization playtimes were relatively equally distributed among them (mean = 33.40 hours; median = 26.95 hours), and only a few of the volunteers had played the game before. In fact, several participants did not usually play video games at all. In addition, their grade point averages covered a considerably broad spectrum, from 4.00 to 5.83, and were also evenly distributed (mean = 4.84; median = 4.71). Accordingly, both from a gaming and an academic performance perspective, we believe our small sample may be representative.

In addition, even though the participants were assigned randomly to groups, the groups’ composition may have affected individual game performance. To account for the groups’ different playing times, we measured game performance as mean points per turn. However, as other factors at the group level, especially skill-related factors, may have biased our results, we also constructed linear mixed-effect models, which allowed the coefficients of our independent mean-points-per-turn variable and the intercepts of the regression functions to vary for each group. We compared the models with and without random slopes and random intercepts using likelihood ratio tests and found no significant difference.

The measurement of our main independent variable, mean points per turn, and our dependent variable, academic performance, could also be problematic. As to the former, the participants’ Civilization scores were automatically calculated by the game. While the factors that determine these scores (e.g., population size, technologies, wonders) are discussed in various gaming forums, it is unclear how the scores are actually calculated. As to the latter, it is difficult to assess participants’ academic performance, especially their potential job performance, solely based on grades. Therefore, we used not only the participants’ grade point averages in our model but also considered how far they had progressed through their curricula. Doing so not only helped to account for the low variability in our Swiss-grade data, which made their use as a performance measure difficult, but also provided a more holistic and fair picture of the participants’ aptitude. In addition, we controlled for other variables that may have influenced the participants’ academic performance, such as part-time jobs and studies abroad.

Against this background, we believe our early-stage research makes an important step toward clarifying the potential of strategy games like Civilization as performance-prediction tools. However, academic performance and job performance are not the same, and though grades are commonly used in selection processes, their predictive validity is rather low. While grades can be a useful tool in predicting some aspects of job performance beyond subject knowledge like problem solving and teamwork, there are better ways to evaluate and select personnel. As the next section explains, we are in the process of learning more about our participants’ analytical and interpersonal skills and how these skills are related to success in the game through the use of assessment centers.

Outlook

Assessment centers are usually perceived as accurate predictors of career success (Waldman and Korbar 2004), and they have become one of the most widely used means of personnel selection (Spychalski et al. 1997). Assessment centers’ greatest advantage over predictors like grade point average is that they collect information concerning multiple kinds of skills, providing a detailed and comprehensive picture of applicants’ knowledge and abilities (Arthur et al. 2003; Meriac et al. 2008).

Assessment centers combine traditional assessment procedures (e.g., interviews, simulation exercises, case studies, and personality tests) and follow a systematic process of observation and judgment by experienced assessors (Thornton and Rupp 2006). Although their validity has also been the subject of skepti-
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cism—especially their construct validity has been discussed controversially (e.g., Bycio et al. 1987; Fleenor 1996; Sackett and Dreher 1982)—several studies have confirmed their ability to predict job performance (e.g., Arthur et al. 2003; Gaugler et al. 1987; Schmitt et al. 1984).

Between May and July 2015, we organized ten five-hour assessment centers, each with the same four participants who played together in the game sessions. Our assessment centers consisted of a presentation exercise, an in-basket exercise, a case study, a role-based interview, a group discussion, and a personality test. Our exercises were intended to capture skills like organizing and planning, problem solving, drive, communication, consideration of others, and ability to influence others (Arthur et al. 2003). All exercises were supervised, and we videotaped the participants’ work on all exercises except for the written case study and in-basket exercises to facilitate the detailed analysis that comes next on our research agenda.

As Civilization does not provide detailed performance data for an in-depth comparison of various skills, we also developed a mod (“modding” = modifying the game; Owens 2011) and ran it during the ten multiplayer games. The mod collected nearly 150 performance values per player and per turn, including scientific, cultural, religious, and economic data, so it provided us with a near-complete picture of each participant’s performance in the game. It also logged the players’ in-game chats, which may help us learn more about their personality traits and social skills. As such, the Civilization data we collected will not only allow us to compare game performance with various skills but may also help us to determine whether the participants showed behavior in the game that they would not be likely to disclose in a job application procedure, a known limitation of personality tests (Morgeson et al. 2007).

In our future work we will explore, analyze, and interpret the Civilization data we collected and compare them with the assessment center results to learn more about Civilization’s potential to predict job performance using a variety of skill dimensions. (Our own Civilization V playtimes exceed 1,500 hours, so we are well-prepared for this analysis.) In a few years, we may eventually be able to measure the participants’ actual career success (e.g., via mail surveys), which would help us to assess the validity of our results.

We believe that our study can then make some important contributions: Civilization has already received attention from researchers in various disciplines (e.g., Hinrichs and Forbus 2007; Owens 2011; Poblocki 2002; Testa 2014), and its potential as an educational tool is well-known (e.g., Shreve 2005; Squire and Steinkuechler 2005), but application scenarios in hiring have not yet been explored. The use of game elements in business contexts (“gamification”) (Deterding et al. 2011), including employee recruiting (e.g., “My Marriott Hotel” on Facebook) (Park and Lim 2014), has been studied, but the business potential of strategy video games like Civilization is yet to be exploited.

Among our potential contributions, we may be able to characterize Civilization as being capable of measuring individual potential in various dimensions of job performance. The use of strategy video games for personnel evaluation and selection could save companies time and money, as procedures like assessment centers are time-consuming and expensive. It is also conceivable that strategy games like Civilization can not only measure potential performance but can even improve job performance, such as at the analytical level, so our results might also contribute to the design of game-based personnel development tools. Companies might then use strategy games for employee development, and job applicants might use them to test and train their abilities before they participate in assessments. As IS researchers typically study the interplay of people and technologies in business contexts, they are well-equipped to support the design of game-based assessment and training systems and to develop theories about their adoption and use.

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