

Do gamers change attitudes towards economics through playing manager games?

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Abstract

Manager games (digital simulation games whose terms of victory are defined as economic goals and whose decision parameters are predominantly economic means) are seen by both parents and educators as useful due to their reportedly educational value. However, there are as yet only a few studies with regard to domain-related transfers such as attitudes. This paper examines the effect of manager games such as Anno 1701, the Fußball Manager-series, SimCity IV and others on economic attitudes in informal settings. The objects of economic attitudes in this context is not economics as a subject, but economically important concepts. In the study a group comparison design is combined with a study of long-term real-life players. Results show that despite manager gamers differs from other gamers in some learning antecedents, only some games have an influence, and only upon the attitudes towards the role of competition and growth. Hopes of informal learning in digital games played for their entertaining value might be overblown.

1 Object of research

In order to answer the question as to what economic attitudes gamers acquire in manager games, we have to identify relevant games for this research, i.e. define the term manager games. Existing genre classifications do not help: They reflect cultural differences (Kerr 2006, 39) and lack consistence (Klimmt 2001, 483). With respect to the latter they mix aims and means in games. This results in a plethora of different classifications, originating from the academic sphere, vendors and computer game journalism. Having in mind that the economic aspects of games are of interest here, none of the existing game genres covers them exactly. Borrowing the analytical framework of Frasca (cf. Schrape 2008, 113), who used a layer model to describe games, I define manager games as digital simulation games whose terms of victory are defined as economic goals and whose decision parameters are predominantly economic means. Related to the narrative context, some might have a macroeconomic perspective (a political entity, e.g. in 1701 A.D) or a microeconomic perspective (an enterprise in its broadest sense, like a soccer club). The former are sometimes referred to as “god games” or “build-ups” whilst the latter are sometimes referred to as “manager games” in the true sense of the word. We will use the term “manager game” for both types here until a subdivision is necessary later on. With aforementioned definition in mind, I identified the commercially most successful manager games of the last five years. Some games which were published prior to that period were included because they sold very well in the budget segment beyond their immediate publication date but largely unnoticed by the wider public.

game	year of publication
Anno 1404 (1404 A.D)	2009
Anno 1701 (1701 A.D)	2006
Fußball Manager 2010	2009
Fußball Manager 2009	2008
Fußball Manager 2008	2007
Fußball Manager 2007	2006
SimCity IV Deluxe	2003
Civilization IV	2005
Rollercoaster Tycoon III	2004
Zoo Tycoon II	2004
Die Siedler VI – Aufstieg eines Königreichs	2007
Die Siedler II – Die nächste Generation	2006

table 1: Analyzed games and years of publication

Manager games are a highly successful game genre in Germany. Though hard to come by, one can assume that sales figures for manager games have soared in the last few years making them one of the most successful PC game types in Germany. Anno 1701 was the most successful game in 2006, its successor Anno 1404 was the most successful in 2009, selling more than 200,000 copies per year. The Fußball Manager-series is almost as successful, ranking regularly in the top ten and selling more than 100,000 copies a year. The same applies to SimCity IV, games of the Settlers-series, the Rollercoaster Tycoon-series, the Zoo Tycoon-series and the Civilization-series, though they range in a lower price segment of the computer game market making them less visible for the wider public due to the relative lack of marketing efforts.

2 Motivation of the study and research question

There are claims from various sides in respect to the games' effects which contrast sharply with the negative perception of other games (mostly first-person shooters). Manager games are said to have an educational effect, making them "good games" in public perception as opposed to "bad games" like first-person shooters. (e.g. Pöppinghege in a ubisoft video, 2009). Peter Moore, chief operating officer at EA games told The Economist newspaper: "German parents tend to see console games as childish, but they think PCs have some education value" (Economist 50, 2011). Furthermore, the main and common characteristic of manager games is their economic content, quite similar to that of educational simulation games which are proved to be of high educational value indeed. So an obvious question is: what do players learn about economics when they play a manager game? As the standard definition of knowledge is related to both the cognitive and the affective domain, we can ask more precisely here: (1) do players of manager games change attitudes towards aspects of economics and (2) if so, what attitudes?

3 Theoretical aspects of attitude change

Attitudes are part of a persons cognitions and their change are seen by many as an educational objective (BMBF 2009, 20 u. 72), which also applies to economic education (Beck 1993, 30 u. 87ff.). Attitudes are defined as "psychological tendency to evaluate a given object with a certain degree of affection or antipathy" (Haddock/Maio 2007, 189). Analytically, this tendency can be broken down into its direction (positive – neutral - negative) and its intensity (weak – strong). Strong attitudes are interesting due to their effects on behaviour.

Strong attitudes are: (1) stable over time and (2) stable when confronted with persuasive appeals. They (3) affect information processing by directing attention to information which are important for those very attitudes and (4) they can direct behaviour under some circumstances, especially the accessibility of a specific behaviour and the degree of self-monitoring (Haddock/Maio 2007, 215f; Kardes et. al. 1986, 469).

According to the Elaboration Likelihood Model of general attitude formation it depends on the pathway of information processing if weak or strong or weak attitudes are formed. When there is the cognitive capability and the motivation to process information centrally, an individual exerts “considerable cognitive resources” (Petty/Cacioppo 1986, 129) to process these information and thus uses rational analysis and recollections for formation. However, due to cognitive capacity constrains or the lack of motivation, this is not always feasible. In this case information is processed peripherally, influenced by factors such as classic conditioning, mere exposure, social desirability, etc (Petty/Cacioppo 1986, 130) and thus resulting in weak attitudes. The pathway of information processing is furthermore linked with age: the younger a person, the more likely he/she will process information peripherally, so older persons can be expected to have strong attitudes. If applied to playing entertaining digital games we stated above, that this activity very often causes a state of flow, which means that the challenge presented by the game and the player’s capabilities align. This means that there must be the cognitive capability to process information centrally. What is more, informal learning is accompanied by a high degree of motivation, so the motivation to process information centrally can also be considered a given.

Research of media use has picked up an element of attitude change: the direction of information. According the approach of cognitive dissonance individuals seek stimuli which are in accordance with their cognitions, thus preventing cognitive dissonance. With respect to media, one speaks of selective exposure to media, selective perception of a medium and selective memory of parts of a medium. This acts as multi-layered filter against dissonant cognitions. Should dissonance really appear, it leads either to an avoidance reaction or the individual produces consistency by forcing new information into existing schemata. Therefore, according to this approach, a structural linking is in force that makes players “*choose games which fit them: both with regard to their affections, interests and antipathies (...) and with regard to personal characteristics, concrete situations in life and structural characteristics of their life*” (Fritz 2003, 19).

A different approach to explaining media use is uses and gratification-theory. According to this approach, “*people seek media (content) in order to reach goals or to fulfil other needs*

and interests” (Von Salisch et. al. 2006, 148). One of the main needs in adolescents is “Developing conscience, moral standards, and values” as well as “Developing attitudes towards social groups and institutions” (Von Salisch, Oppl/Kristen 2006, 149; cf. Havighurst 1953). It is assumed that adolescents only form attitudes to any institution only as recently as these institutions are cognitively dealt with. In the case of the state and competition, or economic and political topics in general, this should occur at some time during adolescence with its peak between the age of 16 and 25 (Schäfers/Scherr 2005, 126; Reinders 2001, 240). Therefore, up to a point there are no clear economic or political attitudes which could influence game choice. Games are played for numerous reasons anyway, especially for distraction, entertainment and competition (Sherry et. al. 2006, 217ff; Raney, Smith/Baker 2006, 166; Fritz et. al. 2011, 58ff.). So it is fairly possible that someone plays a game with economic contents out of other motives than interest in and special attitudes towards economics. In this case it is possible that new attitudes are formed through game use. This attitude formation during adolescence is empirically proven (Mussen et. al. 1977, 75).

All in all, the theory of cognitive dissonance explains game choice and attitude intensification in older persons, though it neglects the formation of attitudes in earlier adolescence which in turn is better explained by the uses-and-gratifications approach and the theory of psychological needs in adolescence.

4 Research into attitude change

There is research into what determines attitudes towards the subject of economics in undergraduate students generally (Walstad/Rebeck 2001; Bechert/Quandt 2009; Würth/Klein 2001). Findings are that generally male, older and politically right persons have more positive attitudes to conservative/liberal positions. Studies about attitudes towards economic concepts in the context of the European Values Study (EVS) have found similar results. It claims to measure attitudes towards two economic core concepts: attitudes towards the role of state and towards the role of competition within the economy. Younger persons, men, persons with high income and higher education had a stronger preference towards competition and a weaker role of the state than female persons, younger persons and those with a lower income and lower educational status (Arts et. al. 2003, 204). The latter two variables are closely linked to socio-economic status of a person. As shall be argued below, the two mentioned constructs could not be replicated perfectly in our data, so that we resorted to

analyzing the single items separately¹. Würth and Klein were able to replicate the findings of the EVS (Würth/Klein 2001, 187 & 224).

Research on attitude change through computer games has been sparse. To the knowledge of the author, there is no study on economic attitude change through digital games. That said, high hopes are connected to informal learning in leisure time - however, research “in informal learning processes when using purely entertaining computer games is relatively moderate, inconsistent and disparate” (Klimmt 2006, 30; translation: MR).

The discussion on games affecting attitudes has been triggered by gender stereotypes in games, most notably the Lara Croft character in the Tomb Raider-series. However, no effect on players’ real life attitudes towards women could be found (Mikula 2003, 79). One of the shortcomings of this research was that it solely focused on gender representations in the games and from those inferred to the likely affective outcome (Bryce/Rutter 2001).

A second line of research into game-induced attitude change is that into violent-affirmative attitudes and violent behaviour. Results have been contradictory, with some meta-studies finding a positive relationship, some a negative one and some no relationship at all (Glock/Kneer 2009, 151).

5 Informal learning

The games studied here are designed as entertainment games and the potential effects of which stem from the entertaining use of these games in the players’ free time. Therefore, we have to look into informal learning processes as they have implications for our research methodology. Informal learning is fundamentally different from formal learning. Generally, informal learning is learning which does not take place in schools, but outside school and which is described as self-help-learning (Dohmen 2002, 19). It entails the learners’ own learning goals and learning organization (Kirchhöfer 2002, 32) when facing a relevant problem: It occurs “wherever people have the need, motivation, and opportunity for learning” (Marsick/Watkins 2001, 28). Especially playing games teaches players to learn informally

¹ The exact wording of the items is: 1. Incomes should be made more equal as incentives for individual effort vs. We need larger income differences. 2. Private ownership of business and industry should be increased vs. Government ownership of business and industry should be increased. 3. The government should take more responsibility to ensure that everyone is provided for vs. People should take more responsibility to provide for themselves. 4. Competition is good. It stimulates people to work hard and develop new ideas vs. Competition is harmful. It hard brings out the worst in people. 5. In the long run, hard work usually brings a better life vs. Hard work doesn’t generally bring success — it’s more a matter of luck and connections. 6. People can only get rich at the expense of others vs. Wealth can grow so there’s enough for everyone.

(Kirchhöfer 2002, 31). Informal learning activities are perfectly voluntarily and driven by “a high degree of motivation [...], instrumental for these individuals in maintaining and constructing a sense of self” (Sefton-Green 2004, 23f.). Games are ideal to nurture the need of self-assurance, given their very characteristics of instant feedback and flexible difficulty. That is the reason why flow easily occurs in games (Fritz/Misek-Schneider 1995, 106; Oerter 1993, 13; Garris et. al. 2002, 449), which again has the same trigger states as achievement goal motivated behavior (Rheinberg 2000, 155). We can therefore conclude that what we see in gamers is a highly motivated, voluntary behavior. Otherwise gamers would not have played their games voluntarily for so long. This behavior possibly leads to learning, including acquiring new attitudes.

6 Research Methodology

Apart from these content-related findings, we took into account two lines of criticism regarding research methodology in media effects research: 1. There are few studies tracking long-term effects and 2. there are few studies involving real-life players instead of student novice players (cf. Glock/Kneer 2009, 152; Bensley/Van Eenwyk 2000, 244ff; cf. Bonfadelli 2004, 36ff). In order to assess what players might have learnt from playing the above-mentioned games, we analyzed these games in terms of economic contents. Then we used tested and proved items from the European Values Study (Bechert/Quandt 2010; Hölscher 2006, 107; Arts et. al. 2003, 204) on attitudes towards economic concepts.

Concerning the study design, we tried to take into account above-mentioned current criticism of game research stemming from wide-spread laboratory research. Therefore, we studied actual gamers who played their games for a long time, instead of novice students. Gamers were recruited in online discussion boards and queried using an online questionnaire (LimeSurvey, an open source program. cf. www.limesurvey.org). The questionnaires were linked in game publishers' discussion boards and in some of the largest German-speaking fan-driven boards. After one month, a dataset with $n=140$ was collected. This group could be subdivided into manager game players ($n=35$), other gamers ($n=99$, mostly players of action and role play games) and non-gamers ($n=6$). As person variables affecting economic attitudes are known, they could be controlled for, i.e. the effect of playing manager games could be isolated. In a pre-analysis it could be confirmed that with regard to age, educational level, socio-economic background, parents as entrepreneurs, type of school visited and migration

background, the two groups did not vary significantly.² Both groups were predominantly highly educated, white, upper middle class, in their 20's and tech-savvy. However, this assumption of group equality does not apply to two variables: gender and interest in economics: The group of manager gamers was predominantly male and had a significantly higher interest in economics. An overall analysis showed that economic attitudes did not vary between males and females in the complete sample, contrary to previous findings (see above). This might stem from the fact that the sample consists of technology-savvy young persons who all share interests in related fields as shall be argued below. With regard to different interest in economics, we argue that this is not a problem in this context either. Interest is a cognitive-affective construct, which is clearly associated with learning (Krapp 1999, 24; Henn 2010, 2; Spinath 2011, 51). Interest alone, however, does not translate into more knowledge or attitude change per se, but only by engagement with the object of interest (Spinath 2011, 47; Henn 2010, 42). Therefore we argue that interest in economics might have influenced the choice of games (Fritz et. al. 2011, 58), but the extent to which it translates into attitude change should depend on the duration of use. With increasing duration of playing manager games, economic attitudes should therefore be stronger in the manager gamer whilst it should not change in other gamers.

Group comparisons were conducted using an ANOVA and in part non-parametrical Mann-Whitney-U tests in order to account for small group sizes. In order to account for different group size of manager gamers and other gamers in ANOVAs, other gamers were subdivided into five randomly drawn groups against each of which the manager gamer group was tested. For further analysis using three groups, a Kruskal-Wallis-test of rank sums was performed.

There are clear limitations to this study due to the way data was gathered. Test persons were not assigned to the two groups by random, but on the basis of their game use. What is more, grouping was conducted using the test persons' three favorite digital games. Possibly, the fourth and fifth games would not have allowed a group assignment as clear as it looks like now. Theoretically the groups of manager gamers and other gamers could in fact overlap. But due to relatively fixed genre preferences (Schmidt/Drosselmeier 2011, 55), we could assume, that gamers who predominantly play manager games do not play other games very much and vice versa.

However, we resorted to the methods mentioned above due to several reasons. Firstly, we

² Non-gamers were excluded from the study due to small group size.

must assume that the treatment (i.e. playing manager games) is quite a small one and the effect of it are not to be expected after a few hours of play in a computer lab using test persons. Secondly, the motivational character of self-directed learning led us to study real life players instead of randomly chosen test persons assigned with a task they possibly need long to learn or possibly do not like and thus distorting the results of the measurement. Therefore, we can expect a bigger effect of playing manager games when a person plays them voluntarily.

7 Results

For the sample, internal consistency of the latent variables (role of the state, role of competition) was assessed. Contrary to previous findings, Cronbach's alpha was not deemed sufficiently high for the two constructs (role of the state, 2 items: $\alpha=0.49$ and role of competition, 4 items, $\alpha=0.58$) in this sample. Therefore, the six items were considered separately. When comparing the two groups we did not find any differences either between other gamers and manager gamers with regard to attitudes, albeit the manager gamers by trend (insignificantly) scores towards more liberal attitudes (cf. table 2)

		Incomes more equal vs. larger income differences	More pri- vate own- ership vs. more state ownership	Government takes care vs. more private responsibility	Competition is good vs. competition is harmful	Hard work pays off vs. good luck and connec- tions count	Economy as a zero- sum game vs. growth
other gamers	average rank	85,53	81,95	84,39	80,30	81,26	83,61
manager gamers	average rank	81,76	82,12	77,35	89,98	91,22	83,21
sign.		.647	.983	.389	.220	.223	.960

table 2: attitudes, other gamers vs. manager gamers

Correlations of manager game usage time and strength of attitudes remain non-significant. Therefore, we can assume that manager games as a whole have no significant influence on attitude change when measured against a comparable, young, male, white, upper middle-class and tech-savvy control group playing other games.

Keeping in mind the distinction within the manager gamers we made above, we can further

divide it into those who play “god games” (i.e. games with a macro focus with the player controlling a state-like entity) and those who play “manager games” in a narrower sense (i.e. those with an enterprise focus). The main difference between those two types of game is the market structure and there the role of competition. In god games (Anno series, Settler series, Civilization), the player operates on an oligopolistic market, in which competition as a rule is existence-threatening. Players compete with AI- or human controlled opponents for sparse land and natural resources so that the gain of one player results in a loss for an opponent and vice versa. What is more, production functions are the same for all players and AI-controlled entities, and AI-controlled conduct into research new products completely independent from other players, there is hardly any real trade involving comparative cost and economies of scale. Therefore, these type of games has a (rudimentary) military component because the lack of interdependence between parties and the strive for autarky does not preclude violent conflict resolution. On the other hand, in manager games in the strict sense (Fußball Manager series, SimCity, Zoo Tycoon, Rollercoaster Tycoon), markets are atomistic. Competitors as such are not even simulated in these games, but only customer flows instead. Though land is scarce, it is not contested, but in most games exclusively at the disposal of the player.

		Incomes more equal vs. larger income dif- ferences	More pri- vate own- ership vs. more state ownership	Government takes care vs. more private responsibility	Competition is good vs. competition is harmful	Hard work pays off vs. good luck and connections count	Economy as a zero- sum game vs. growth
god ga- mers	average rank	23.15	23.21	22.76	24.42	23.35	20.37
manager gamers	average rank	24.16	22.63	20.43	20.17	23.78	29.38
sign.		.802	.884	.559	.277	.915	.027

table 3: differences between god gamers and manager gamers

As group sizes are small in this sub-analysis (30 god gamers vs. 16 manager gamers) results are to be considered with care. After using a Mann-Whitney-U test for rank sum differences, attitudes towards statism and growth yield significant results. When asked whether one can only get rich on the expense of others (the economy as a zero-sum-game) or whether there can be growth so there's enough for everyone (added value perspective), god

gamers significantly rather favored the zero-sum perspective while manager gamers favored the growth attitude (cf. table 3). This correlates with the image of the overall economy in these two types of games: in god games, competition is existence-threatening and growth mainly occurs at the expense of other parties in the game. This is not the case in manager games, where the whole economy can grow without any party necessarily loosing in the process.

Using the control group as benchmark, it scores in between the two sub groups (cf. table 4), suggesting that with regard to the role of competition and the state, god games and manager games (in the strict sense) represent opposite sides on an attitude continuum of attitudes towards growths and competition with control group (i.e. mainly players of sports, shooter and role play games) in between. Group sizes were too small to broaden the finding with a regression using the time played.

		Incomes more equal vs. larger income differences	More private ownership vs. more state ownership	Government takes care vs. more private responsibility	Competition is good vs. competition is harmful	Hard work pays off vs. good luck and connections count	Economy as a zero-sum game vs. growth
all other gamers	average rank	82,69	78,89	80,96	77,87	78,36	80,81
god gamers	average rank	77,42	80,16	78,48	91,82	87,23	68,71
manager gamers	average rank	80,56	77,66	69,61	78,00	88,31	100,28
sign.		0,851	0,982	0,662	0,293	0,506	0,081

table 4: other gamers vs. god gamers vs. manager gamers

As there is no correlation between playing time and attitude strength, one might question that the games considered here had an effect. Instead, one could posit that different attitudes growth and competition have determined game choice in the first place. However, there are studies which have found that persons with a high competitive trait prefer god games, i.e. games in which competition is intense and possibly existence-threatening for the player in the game world (Vorderer et. al. 2003, 7). This is in line with common sense and the theory of cognitive dissonance: competitive players should play games with fierce competition.

Thus, negative attitudes towards economic growth and economic competition in the real world in god gamers are most likely the outcome of game use. This is the more highlighted when compared to the control group which also plays competitive games like sports games and shooters. These games do not portray any state-like entity and these gamers also have a high competitive trait. But attitudes towards growth and competition in this group rather tend to those of manager gamers.

8 Discussion

If there is an effect on attitudes of the games studied here, it is small and partial. Though manager gamers tend to have more liberal attitudes in general, these differences in comparison to other gamers are not significant. A key to understanding this lies in the results of the qualitative part of the survey, where test persons were asked what they think they have learnt in games generally. Although these questions were answered with respect to factual knowledge, we can draw a few conclusions to learning in general. Test persons either do not see any connection between the games and economics, refer very concrete examples from the games instead of describing concepts, reveal that they have recognized known concepts in the games instead of having learnt new ones or refer very blurry concepts (cf. Rehm 2012). This all hints to the point that any learning was restricted to the game world and gamers did only sometimes perceive parallels between the game world and the real world.

The largest effect is that of manager games in the strict sense. Manager games have an impact on viewing the economy as potentially growing, whilst god games tend to support a static view. This might stem from the fact that god games often involve AI opponents with whom players fight for finite resources like arable land and minerals. In economic literature, growth is mainly explained by technical innovations, making processes more efficient and thus freeing up resources to be used elsewhere. This is also the case in many god games (e.g. the technology research in Civilization and 1404 A.D.) – however gamers seem not to see the connection to overall efficiency and growth.

Further research is needed into how users individually interpret what happens in simulation games, especially if they really perceive the player-controlled entities as state-like entities. In how far they interpret game events as reality-like and therefore information worth transferring to the real world.

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