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VIDEO GAMES CONTRIBUTION TO STUDENTS' ENTREPRENEURIAL TRAITS AND INTENT

Empirical study

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Abstract

Given the popularity of video games and the influences they may pose on individuals' psychology and behavior, the present study analyses whether video game playing among university students can be correlated with traits associated with an entrepreneur's profile, which may, in turn, lead to an entrepreneurial intent. The results of the study reveal that students who do play video games show a higher entrepreneurial intent, this relationship being mediated by several psychological and cognitive characteristics. With regards to the psychological and cognitive factors studied, the results also suggest that a favorable attitude towards playing videogames fosters students' entrepreneurial potential and has a positive effect on the entrepreneurial intent.

Introduction

The digital environment has brought a plethora of challenges and opportunities to developmental science, education and family life dynamics. Today's educational institutions are faced with similar remodelling, and education makes no exception, as research in the field of developmental science brings forth a better understanding of how learning environments shape the development of individuals, as well as new standards and expectations for cognitive and social development; and different standards for educators and caregivers. In order to produce long term economic benefits for a country, the contribution of education lies in identifying and fostering of entrepreneurial potential throughout the educational process.

In shifting the focus from traditional education to less conventional approaches, evidence has been found regarding the effects of video games on various subject areas (Young et al, 2012). Although many educationally interesting games exist, evidence regarding their impact on student achievement or entrepreneurial potential is slim.

Taking into consideration the positive psychological and cognitive effects conferred by exposure to video games and those traits that are specific to entrepreneurs, we ask the following research questions

(1) Do playing computer games positively contribute towards the learning or strengthening of some psychological attributes characteristic to entrepreneurs?

(2) Do playing computer games positively contribute towards an entrepreneurial intent?

The present paper focuses on the idea that playing video games may be a tool in sustaining entrepreneurship traits and fostering an entrepreneurial intent.

1. Background. Developing a model for video games contribution to entrepreneurial traits and intent

Starting in the mid-twentieth century, a range of entrepreneurship scholars from different academic fields began looking at entrepreneurship from a multidisciplinary perspective (eg. Murphy et al, 2006, Baron, 2004) to help create a profile of characteristics that are unique to entrepreneurs.

As far as literature on entrepreneurial attributes is concerned, the psychological predispositions of entrepreneurs include (Bardi et al, 2009): need for achievement, self-direction (a need for autonomy), openness to change (tolerance for ambiguity), and self-efficacy.

According to the Theory of Planned Behavior (Ajzen, 1991, 2002), the antecedents to one's entrepreneurial intent can be grouped into three categories: attitude toward starting one's own business; subjective norms; and perceived behavioral control. In this respect, we go on to describe our proposed variables:

(1) The attitudinal variable named in the proposed model as "Atit" represents the degree to which one perceives a positive valuation towards being an entrepreneur;

(2) The subjective norm variable, henceforth named "NS" represents the perceived social pressure from relatives and close friends in the case of starting one's own business;

(3) The perceived behavioral control variable, henceforth named "Ctrl" represents the perceived ease of starting a business.

(4) The need for achievement variable, henceforth named "Nach", as a personality trait or motivation towards the goal of starting one's business;

(5) The need for autonomy variable, henceforth named "Nfaut", is characterized by the degree to which one prefers to have freedom an control over performing a certain task or job;

(6) The tolerance for ambiguity variable, henceforth named "TolA", is characterized by one's willingness to take chances when faced with a decision or accept challenging goals;

(7) The self-efficacy variable, henceforth named "SelfEf", is characterized by one's self confidence in performing certain tasks, in this case tasks related to being a successful entrepreneur;

(8) The measure for behavioral intent, henceforth named "Int", is derived from Söderlund & Öhman's triple intention scale (Söderlund & Öhman, 2006), namely intention as a plan, intention as an expectation and intention as a desire to start one's own business.

Due to the fact that the nature of video games has changed dramatically over the past decade, by becoming increasingly complex, diverse, realistic and social in nature (Ferguson & Olson, 2013), it is hard to use past scales to measure their use statistically. The body of literature emerging in the last five years, documenting the benefits of video game exposure and plethora of social, cognitive and emotional experiences they provide to users (Granic et al, 2014), stresses the need for new ways to measure their influence. We thus propose an attitudinal scale for videogame exposure, a variable henceforth named "Jvid" comprised of one's want to play video games and one's overall perception of playing video games in terms of satisfaction.

2. Methodology

Data gathering was done via questionnaire, completed by students at three universities in Bucharest, after a critical assessment

of other questionnaires deployed. The final questionnaire was structured into three sections. The first section contained items referring to socio-demographic data, the second section was designed to gather data on the perceptions of the subject's professional future, and the third focused on the subject's psychological and cognitive profile. The final sample was made up of 300 valid questionnaires.

In line with the literature review and objectives of our study, the following hypotheses can be summarized:

H1:There is a direct and positive link between one's attitude towards playing video games and one's intention to start their own business.

H2: There is a direct and positive link between one's attitude towards playing video games and one's need for achievement.

H3: There is a direct and positive link between one's attitude towards playing video games and one's need for authority.

H4: There is a direct and positive link between one's attitude towards playing video games and one's tolerance for ambiguity.

H5: There is a direct and positive link between one's attitude towards playing video games and one's self efficacy.

H6: There is a direct and positive link between one's attitude towards playing video games and one's attitude towards starting a business.

H7: There is a direct and positive link between one's attitude towards playing video games and one's subjective norms.

H8: There is a direct and positive link between one's attitude towards playing video games and one's perceived control over starting a business.

H9: There is a direct and positive link between one's attitude towards starting a business and one's intention to start his own business.

H10: There is a direct and positive link between one's subjective norms and one's intention to start their own business.

H11: There is a direct and positive link between one's perceived control towards starting a business and one's intention to start his own business.

H12: There is a direct and positive link between one's need for achievement and one's intention to start his own business.

H13: There is a direct and positive link between one's need for authority and one's intention to start his own business.

H14: There is a direct and positive link between one's tolerance for ambiguity and one's intention to start his own business.

H15: There is a direct and positive link between one's self efficacy and one's intention to start his own business.

3. Results

The data from the questionnaires was centralized and then analyzed with WARP-PLS Version 4.0.

Following the approach of Bagozzi and Yi for measurement accuracy (internal consistency) it was evaluated based on Cronbach alpha, composite reliability and average variance extracted (Bagozzi and Yi, 1988), found in Table 1. As shown in Table 1, each construct is valid in terms of internal consistency, composite reliability coefficients ranging from 0.858 (construct measuring the attitude towards video games) and 0961 (construct measuring the need for achievement), all composite reliability coefficients exceeding the recommended 0.70 threshold.

In terms of Cronbach alpha and average variance extracted, note that all values are greater than the critical recommended threshold or 0.70, thus verifying the consistency of the constructs.

The most appropriate method of testing the validity of the construction of the variables is with convergent validity and discriminant validity. The matrix structure obtained in Table 2 contains Pearson correlations between indicators and their corresponding latent variables. Thus, all loadings of the indicators corresponding to each latent variable for which they were defined and p values are less than 0.001, regardless of the nature of the variables. All requirements are met, thus the measurements have convergent validity.

After testing discriminant validity, the proper loading of the square root for each variable separately can be seen in Table 3. Table 4 then shows that all correlations between latent variables are significant, at a p-value of less than 0.001, thus respecting the principle of discriminant validity

In Table 5, variation inflation factors are calculated for predictor latent variables in each column with respect to the latent variables in each row (criteria). In this case, VIF Attitude- Intent is 6.961 ($\sqrt{6.961}$= 2.63), so the standard error for the variable coefficient Attitude is 2.63 times higher than it would be if the predictor variables were not correlated with other variables. According to the proposed hypotheses, the variable for Intent presents eight correlations.

The structural model was based on the PLS regression algorithm (structural equation modeling by means of the partial least squares method) and includes the path coefficients (standardized β coefficients) and R squared for each endogenous variable (used to quantify how the variation of the variables can be explained by variation in the other variables).As it can be seen in Table 6, all p values are smaller than 0.05, meaning that all hypotheses are statistically confirmed.

4. Conclusions

In the cases where standardized β coefficient values were very small, such as in the cases of H1, H10, H11, H13, H14, H15, as it can be seen in Table 7, total effects calculation revealed weak f squared Cohen coefficients (<0.15), thus opening new research directions:

(1) It is likely that the intent to start one's own business may not necessarily be mediated by all variables tested.

(2) It is reasonable that although playing video games encourages the development of particular skills and entrepreneurilal traits, some might develop more specific skills than others. Model testing on particular types of gamers in accordance with their gaming preferences might yeld different and interesting results.

(3) Sample size was relatively reduced, thus a larger sample might alter the results of total effects. Although sample size was satisfactory for model testing, it will not accurately represent the entire population.

(4) Multigroup analysis was not performed, and different social-demographic groups could reveal different effect sizes.

To sum up, a comparison between video game players and their less-playing counterparts reveals that players are more inclined towards entrepreneurial behavior. Students who have a more positive attitude towards playing video games also show a higher entrepreneurial intent.

The results obtained show that playing video games has the propensity to strengthen students' capacity to aquire most of the psychological and cognitive processes associated with entrepreneurship.

Future empirical research is required to focus on larger samples of different heterogeneous groups of students, in accordance with their specific degree program.

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Appendices

Appendix A Study measures

Table 1
Internal consistency

Construct	Composite reliability	Cronbach Alpha	Average Variance Extracted
Jvid	0.858	0.778	0.603
Ctrl	0.959	0.948	0.795
NS	0.859	0.746	0.679
Atit	0979	0.971	0.920
Intent	0.924	0.889	0.752
Nach	0.961	0.951	0.803
Nfaut	0.905	0.843	0.762
TolA	0.927	0.895	0.760
SelfEf	0.939	0.913	0.792

Table 2
Combined loadings and crossloadings

	Jvid	Ctrl	NS	Atit	Intent	Nach	Nfaut	TolA	SelfEf	SE	P value
J1	0.853	0.013	0.068	0.143	-0.189	0.158	-0.545	0.017	-0.033	0.049	<0.001
J2	0.819	-0.672	-0.018	0.186	0.083	1.358	-0.012	0.007	0.008	0.049	<0.001
J3	0.745	0.854	-0.014	-0.788	0.109	-2.191	-0.603	0.085	0.105	0.049	<0.001
J4	0.679	-0.144	-0.048	0.461	0.019	0.569	1.36	-0.123	-0.084	0.049	<0.001
ctrl1	-0.078	0.932	0.085	-0.148	0.07	0.223	0.001	-0.103	-0.063	0.049	<0.001
ctrl2	1.275	0.851	-0.086	-0.308	-0.182	-0.922	-0.557	0.095	0.05	0.049	<0.001
ctrl3	-0.345	0.851	-0.369	-0.041	0.071	-0.285	0.145	0.024	0.048	0.049	<0.001
ctrl4	-0.428	0.938	-0.072	-0.089	-0.036	0.155	0.221	0.038	0.042	0.049	<0.001
ctrl5	0.127	0.906	0.17	0.389	-0.042	-0.167	-0.063	0.026	-0.033	0.049	<0.001
ctrl6	-0.499	0.867	0.255	0.19	0.116	0.953	0.231	-0.075	-0.04	0.049	<0.001
ns1	-1.266	0.526	0.578	-0.538	0.107	-0.37	0.733	0.032	0.038	0.049	<0.001
ns2	0.56	-0.259	0.924	0.378	0.03	-0.08	-0.358	-0.031	-0.007	0.049	<0.001
ns3	0.233	-0.07	0.922	-0.042	-0.097	0.312	-0.101	0.011	-0.017	0.049	<0.001
Atit1	0.151	-0.3	0.015	0.97	-0.05	0.024	-0.058	0.005	0.037	0.049	<0.001
Atit2	0.098	0.436	-0.138	0.948	-0.01	-0.281	-0.056	0.012	0.055	0.049	<0.001
Atit3	-0.012	-0.215	0.141	0.954	0.1	-0.041	-0.019	-0.031	-0.064	0.049	<0.001
Atit4	-0.236	0.086	-0.019	0.964	-0.038	0.292	0.133	0.014	-0.028	0.049	<0.001
I1	1.213	0.491	-0.272	-0.546	0.794	-0.87	-0.55	0.072	0.129	0.049	<0.001
I2	0.046	0.146	0.092	-0.018	0.92	-0.126	-0.007	0.011	-0.013	0.049	<0.001
I3	-0.551	-0.029	-0.166	0.205	0.902	0.344	0.205	-0.036	0.011	0.049	<0.001
I4	-0.599	-0.587	0.332	0.313	0.848	0.585	0.304	-0.04	-0.118	0.049	<0.001
nach1	0.229	-0.204	0.135	-0.436	0.093	0.876	-0.154	0.005	0.023	0.049	<0.001
nach2	-0.801	0.647	-0.283	-0.021	0.191	0.846	0.389	-0.021	0.021	0.049	<0.001
nach3	-0.049	0.557	-0.06	-0.049	-0.009	0.91	0.049	-0.005	0.027	0.049	<0.001
nach4	-0.544	-0.31	0.141	0.153	-0.152	0.918	0.296	-0.005	-0.035	0.049	<0.001
nach5	1.083	0.019	0.066	0.146	-0.188	0.916	-0.537	0.018	-0.038	0.049	<0.001
nach6	0.033	-0.668	-0.015	0.187	0.084	0.909	-0.021	0.007	0.005	0.049	<0.001

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naut1	**2.961**	**0.878**	**-0.002**	**-0.776**	**0.103**	**-2.242**	**0.84**	**0.065**	**0.1**	**0.049**	**<0.001**
naut2	**-0.958**	**-0.133**	**-0.042**	**0.463**	**0.014**	**0.526**	**0.89**	**-0.13**	**-0.084**	**0.049**	**<0.001**
naut3	**-1.845**	**-0.699**	**0.045**	**0.271**	**-0.112**	**1.597**	**0.887**	**0.068**	**-0.01**	**0.049**	**<0.001**
tol1	**-0.096**	**0.173**	**-0.07**	**-0.493**	**-0.01**	**0.227**	**0.127**	**0.869**	**0.131**	**0.049**	**<0.001**
tol2	**0.204**	**-0.069**	**0.003**	**0.044**	**-0.123**	**-0.159**	**-0.066**	**0.893**	**0.009**	**0.049**	**<0.001**
tol3	**-0.233**	**-0.23**	**0.051**	**0.252**	**0.15**	**0.28**	**0.057**	**0.859**	**-0.146**	**0.049**	**<0.001**
tol4	**0.117**	**0.125**	**0.017**	**0.2**	**-0.011**	**-0.341**	**-0.116**	**0.866**	**0.005**	**0.049**	**<0.001**
se1	**0.607**	**-0.196**	**-0.034**	**0.223**	**0.041**	**-0.503**	**-0.294**	**0.011**	**0.877**	**0.049**	**<0.001**
se2	**-0.004**	**0.177**	**-0.109**	**0.038**	**0.03**	**-0.205**	**-0.019**	**-0.025**	**0.911**	**0.049**	**<0.001**
se3	**-0.343**	**0.042**	**0.043**	**-0.189**	**-0.076**	**0.193**	**0.237**	**0.036**	**0.906**	**0.049**	**<0.001**
se4	**-0.252**	**-0.032**	**0.104**	**-0.068**	**0.005**	**0.524**	**0.069**	**-0.023**	**0.866**	**0.049**	**<0.001**

Table 3

Corelations among latent variables with square roots of AVEs

	Jvid	Ctrl	NS	Atit	Intent	Nach	Nfaut	TolA	SelfEf
Jvid	0.777	0.732	0.707	0.776	0.512	0.823	0.795	0.57	0.518
Ctrl	0.732	0.892	0.664	0.685	0.444	0.854	0.408	0.451	0.487
NS	0.707	0.664	0.824	0.689	0.432	0.716	0.428	0.543	0.459
Atit	0.776	0.685	0.689	0.959	0.63	0.585	0.676	0.665	0.671
Intent	0.512	0.444	0.432	0.63	0.867	0.419	0.385	0.418	0.424
Nach	0.823	0.854	0.716	0.585	0.419	0.896	0.366	0.457	0.407
Nfaut	0.795	0.408	0.428	0.676	0.385	0.366	0.873	0.467	0.434
TolA	0.57	0.451	0.543	0.665	0.418	0.457	0.467	0.872	0.43
SelfEf	0.518	0.487	0.459	0.671	0.424	0.407	0.434	0.43	0.89

Table 4

 P values for correlations

	Jvid	Ctrl	NS	Atit	Intent	Nach	Nfaut	TolA	SelfEf
Jvid	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ctrl	<0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
NS	<0.001	<0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Atit	<0.001	<0.001	<0.001	1	<0.001	<0.001	<0.001	<0.001	<0.001
Intent	<0.001	<0.001	<0.001	<0.001	1	<0.001	<0.001	<0.001	<0.001
Nach	<0.001	<0.001	<0.001	<0.001	<0.001	1	<0.001	<0.001	<0.001
Nfaut	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1	<0.001	<0.001
TolA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1	<0.001
SelfEf	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1

Table 5
Block variance inflation factors

	Jvid	Ctrl	NS	Atit	Intent	Nach	Nfaut	TolA	SelfEf
Jvid									
Ctrl									
NS									
Atit									
Intent	5.759	3.647	2.559	6.961		3.802	2.837	1.99	2.687
Nach									
Nfaut									
TolA									
SelfEf									

Note: These VIFs are for the latent variables on each column (predictors), with reference to the latent variables on each row (criteria).

Table 6
Path coefficients (standardized β coefcients) and p values

	Jvid	Ctrl	NS	Atit	Intent	Nach	Nfaut	TolA	SelfEf
Jvid									
Ctrl	0.779 p<0.001								
NS	0.761 p<0.001								
Atit	0.784 p<0.001								
Intent	0.092 p=0.032	0.072 P=0.047	0.07 P=0.048	0.424 p<0.001		0.262 p<0.001	0.067 P=0.048	0.007 P=0.44	0.093 P=0.031
Nach	0.87 p<0.001								
Nfaut	0.827 p<0.001								
TolA	0.574 p<0.001								
SelfEf	0.523 p<0.001								

Table 7
Hypotheses testing

Nr.	Hypothesys	β	P	Valid.
H1	There is a direct and positive link between one's attitude towards playing video games and one's intention to start their own business	**0.092**	P= 0.032	**YES**
H2	There is a direct and positive link between one's attitude towards playing video games and one's need for achievement.	**0.87**	p < 0.001	**YES**
H3	There is a direct and positive link between one's attitude towards playing video games and one'sneed for authority	**0.827**	p < 0.001	**YES**
H4	There is a direct and positive link between one's attitude towards playing video games and one's tolerance for ambiguity.	**0.574**	p < 0.001	**YES**
H5	There is a direct and positive link between one's attitude towards playing video games and one's self efficacy.	**0.523**	p < 0.001	**YES**
H6	There is a direct and positive link between one's attitude towards playing video games and one's attitude towards starting a business	**0.784**	p < 0.001	**YES**
H7	There is a direct and positive link between one's attitude towards playing video games and one's subjective norms.	**0.761**	p < 0.001	**YES**
H8	There is a direct and positive link between one's attitude towards playing video games and one's perceived control over starting a business.	**0.779**	p < 0.001	**YES**
H9	There is a direct and positive link between one's attitude towards starting a business and one's intention to start their own business.	**0.424**	p<0.001	**YES**
H10	There is a direct and positive link between one's subjective norms and one's intention to start their own business.	**0.07**	P=0.048	**YES**
H11	There is a direct and positive link between one's perceived control towards starting a business and one's intention to start their own business	**0.072**	P=0.047	**YES**
H12	There is a direct and positive link between one's need for achievement and one's intention to start their own business.	**0.262**	p < 0.001	**YES**
H13	There is a direct and positive link between one's need for authority and one's intention to start their own business.	**0.067**	P=0.048	**YES**
H14	There is a direct and positive link between one's tolerance for ambiguity and one's intention to start their own business.	**0.007**	P=0.044	**YES**
H15	There is a direct and positive link between one's self efficacy and one's intention to start their own business.	**0.093**	P=0.031	**YES**