The Use of Mobile Phone to Improve Learning Performance

Mercedes F. Bernal Lloréns[1] & Juan P. Sánchez-Ballesta[1]

[1] Universidad de Murcia, Spain

Correspondence: Mercedes F. Bernal Lloréns, Universidad de Murcia, Spain

Received: January 20, 2023 Accepted: March 14, 2023 Online Published: March 17, 2023

doi:10.5430/ijhe.v12n2p27 URL: https://doi.org/10.5430/ijhe.v12n2p27

Abstract

In this paper we analyse whether games-based learning improves the motivation and the performance of the students in the Degrees in Business Studies and Economics. We focus on Financial Accounting and use kahoot! as a games-based learning tool using students' mobile phones. Our findings show that the performance of first year Business Studies students does not change, but the performance of those of the second year in the Degree in Economics are much better than without games- based learning. These findings suggest that games-based learning helps to improve the motivation and performance of the students when they have some kind of interest in advancing with their studies.

Keywords: games-based learning, learning process, mobile phone, motivation, accounting education, business studies

JEL classification: I21, I23, M41

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Highlights

(1) Games-based learning improves the performance of the students in Financial Accounting when there exists an extrinsic motivation.

(2) Games-based learning does not improve the performance of the first year's students in Financial Accounting in Business Studies.

(3) Games-based learning may be a useful tool for teaching when there exists a previous motivation of the students towards the Degree.

1. Introduction

One of the main problems of higher education, particularly in those Degrees which are generalist and polyvalent, such as Business Administration, is the lack of motivation of students, which leads to poor results and high dropout rates. In this paper we examine whether the inclusion in teaching activities of those devices that form a part of students' everyday life, i.e. the mobile phone, and their linking to academic rewards, helps to increase motivation, and, consequently, the habits of studying and learning, leading to an improvement in the academic performance of students.

Prior literature has shown that the determining factors behind the choice of taking a Business Studies degree are not vocational but mainly related to economic and social factors (Davies, Tikoo, Ding, & Salama, 2016; Freixa Niella, Llanes, & Venceslao, 2018), since the interest of the students in the degree is not high but it does offer more opportunities for the development of a professional career. Thus, it is a practical rather than a vocational decision, which may create in the students some difficulties in their identification with the content of the degree, with the results of poor motivation and performance. This can even lead to the inability of some students to continue with their studies beyond the crucial adaptation period to the university which has been widely studied in the literature (Spady, 1970; Bean, 1980; Pascarella, Smart, & Ethington, 1986; Tinto, 1987; Berger, 1999; Hakyemez, 2021). Effectively, incorporation to the university involves an important change for students with respect to secondary school, since they must adopt more autonomy and responsibility in their tasks outside the classroom (Wolters, 2020) and they have to get used to a new social environment (Credé & Niehorster, 2012). This may lead to a high degree of

academic and social stress (Shaunessy-Dedrick, 2015) in those teenagers who are enrolled for their first time in higher education studies, which may result in the abandonment of their degree during the first academic year (Freixa Niella et al., 2018, p.199).

Therefore, the first academic year in higher education studies constitutes the foundation for students not dropping out from University and to projecting their future academic success, and in this sense Adelman (1998) shows that there exists a significant relationship between the marks in the first academic year and the final qualification of the bachelor's degree. Specifically, the first semester of the first academic year seems to be the critical moment in relation to permanence at university (McGrath & Braunstein, 1997; Raab & Adams, 2005), and the seventh week of that semester is when the students develop a sense of membership (Kane, Chalcraft, & Volpe, 2014).

Taking this into account, in this paper we focus on the students of the first academic year at university and in the critical first semester of the Degree in Business Studies and compare their performance with those students of the Degree in Economics in their third academic semester. We study whether the inclusion in teaching activities of mechanisms related to students' leisure devices may motivate them and contribute to improving their study habits, thereby increasing their learning performance. We study the effect of games-based learning in Financial Accounting I in Business Studies, a subject that requires learning a new language, and we distinguish between those students that have enrolled for the first or for subsequent times. We also carry out the same experiment in a different context, the second year (third academic semester) of the Degree in Economics, a Degree in which, in comparison to that of Business Studies, the students show important differences in terms of motivation and where Financial Accounting is a subject considered less relevant for their professional career but nonetheless with exactly the same level of difficulty as in the Business Studies Degree. Due to the association between study habits and target achievement (Wood & Runger, 2016), we link the use of mobile phones with academic rewards that help create good study habits (Lally & Gardner, 2013; Fiorella, 2020; Bearson, 2020).

The findings show that there are no significant differences in Financial Accounting I in the Business Studies Degree. However, in Financial Accounting II, within the Economics Degree, games-based learning significantly enhances both academic performance and grades, and for both types of students, those from the first or subsequent enrolments. This suggests that the games-based learning does not help the learning process unless there already exists a positive and responsible attitude on the part of the student towards this process.

This paper contributes to the literature by showing that by incorporating games-based learning into the learning process through those devices that the students are more familiar with, such as the mobile telephone, academic results improve for those students that have some degree of motivation and responsibility.

The rest of the paper proceeds as follows. Section 2 develops the literature framework, Section 3 presents the empirical design and the results, and the final conclusions are presented in Section 4.

2. Literature Framework

Motivation in the students of the first year at university may refer to two different moments in time. On the one hand, there is an ex-ante motivation, which consists of the reasons why the student chooses a specific Degree, which in our paper is the Degree in Business Studies. On the other hand, there is an ex-post motivation, which refers to the interventions that could be established for improving the motivation of a student who has already decided to enrol in a specific Degree.

According to Deci & Ryan (1985), the comprehension of human motivation requires the consideration of three basic psychological needs – autonomy, competence and relatedness– and the search to satisfy these determines the energy of behaviour. In this context, autonomy refers to the need to take control over one's own actions, competence is related to the need to affect one's own results, and relatedness deals with the experience of good social relations.

Thus, by examining how these needs are satisfied, we can distinguish, basically, between intrinsic and extrinsic motivation. Intrinsic motivation consists of carrying out activities for pleasure, whereas extrinsic motivation is related to issues such as rewards, avoiding punishment or obtaining the approval of others. Several studies have shown the positive association between intrinsic motivation, deep learning and creativity (Ryan & Deci, 2000).

There are prior studies which analyse the importance of motivation in studies in Business Administration, in countries such as the UK, Ireland, Greece, China, Arab Emirates, the USA (Byrne & Flood, 2005; Byrne et al., 2012; Davies et al., 2016) and Spain (Arquero, Donoso, & Seltzer, 2006; Arquero, Byrne, Flood, & González, 2009; Arquero, Fernández-Polvillo, Hassall, & Joyce, 2015; Freixa Niella et al., 2018), and all conclude about the influence of external motivations in students' choice of these studies, i.e. these studies are not vocational (Arquero & Fernández-Polvillo, 2019).

In addition to this lack of motivation, the first-year student is faced with the difficulties of adapting to the academic environment at the university (Spady, 1970; Bean, 1980; Pascarella et al., 1986; Tinto, 1987; Berger, 1999; Hakyemez, 2021; Credé & Niehorster, 2021; Shaunessy-Dedrick, 2015). This, in turn, leads to high dropout and low performance rates. In this sense, some studies have shown that lack of preparation and scant motivation are the main variables that explain abandonment in higher education (Ozga & Surhanandan, 1998; Boyle, Carter, & Clark, 2002).

Taking this into account, the teaching concern in those studies characterized by low extrinsic motivation should be addressed to increase the motivation of the students. Moreover, extrinsic motivation may be internalised through a series of steps (Ryan & Deci, 2000) so it can be integrated in the student's sense of being.

Since these are students at university, the required level of autonomy and responsibility is higher than at secondary school, with activities outside the classroom being under their own direction (Wolters, 2020). Hence, in order to improve academic performance, the creation of habits (Wood & Runger, 2016; Fiorella, 2016), which may enhance the students' own perception of competence, is crucial. From the accounting point of view, Byrne, Flood, & Griffin (2014) show the association between the student's confidence to understand the content of a course and their own academic performance.

There is evidence that shows the relation between regular habits of studying, such as the revision of materials (Credé & Kuncel, 2008, p.305), and academic performance (Baquiran, 2011, P.1116). Montes (2012), highlighting interpersonal differences, defines these habits as a set of activities that every person puts into practice when studying.

These habits may be modified with interventions that, through repetitive tasks, may generate new behaviour in the students (Wood & Rüngers, 2016). From the point of view of Business studies, Nonis & Hudson (2010) find a significant association between habits of studying and academic performance.

Considering the model suggested by Cerna & Pavliuschenko (2015), according to which it is necessary to change habits in order to achieve a sustainable academic performance, Figure 1 shows the design that enables the internalization of extrinsic motivation.

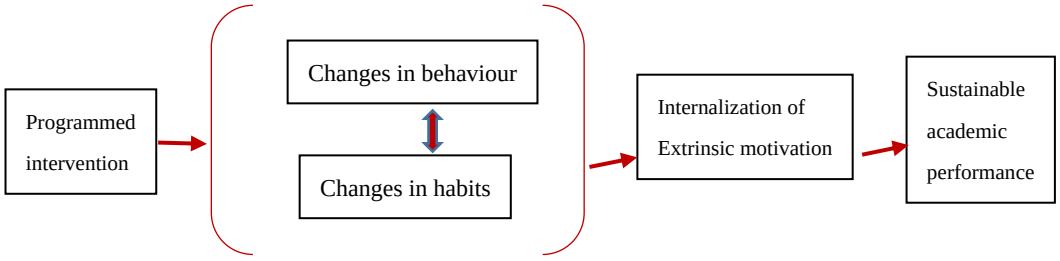

Figure 1. Internalization of extrinsic motivation (Cerna & Pavliuschenko, 2015)

In this sense, active learning activities and gamification are considered to play a relevant role in changing the habits of studying, and previous studies have examined whether business games represent a useful tool to improve students' perception of learning (MacNamara & Murphy, 2017; Silva, Rodrigues, & Leal, 2019; Silva, Rodrigues, & Leal 2021). However, the evidence on the effectiveness of the implementation of active learning activities is mixed in accounting (Fox, Stevenson, Connelly, Duff, & Dunlop, 2010; Turner & Baskerville, 2013; Carenys & Moya, 2016). Sugahara & Cilloni (2021) suggest that a key factor in this effectiveness is the perception of accounting on their learning approaches, which could be enhanced by a short-term experience of game-based learning. This may be implemented through mobile apps' gamification elements, whose impact on students' engagement, retention and achievement seems to be positive (Voshaar, Knipp, Loy, Zimmermann, & Johannsen, 2022).

Since these previous studies are not focused on students facing the critical semester at University, our aim in this paper is to assess whether the design of informative interventions enables an increase in motivation among first year students, changing their learning through feedback (Fisher, 1978; Ryan, 1982; Pardo & Alonso Tapia, 1990; Kusurkar, Croiset, Olle, & Ten, 2011) and improving their academic performance. These interventions would have as a main objective the repetition of behaviours. In our view we adopt, as a measure to foster increased awareness of the students' own capacities over a particular subject, the realization of small multiple-choice exams throughout the semester, since these would allow them to become aware of the reasons why their beliefs are incorrect (Blackwood, 2013, p. 75). In this way, knowing their mistakes and revising their materials – questioning themselves more frequently about their knowledge, they can improve their study habits and obtain a sustainable academic performance (Wooten, 1998; Credé & Kuncel, 2008). This action may be especially valuable for an accumulative

subject such as Accounting. From another point of view, these repetitive exams could reduce students' anxiety concerning the final exams and thus improve their competence, which would lead to an internalization of the extrinsic motivation. Therefore, our hypothesis is that the realization of these multiple-choice tests through their mobile phones increases students' motivation and performance.

3. Empirical Design and Results

We compare two groups from the first academic year in the Degree in Business Studies corresponding to two consecutive periods, one in which there are no interventions to improve motivation (2019-2020) and another one (2020-2021) where we have applied a strategy of games-based learning ("Endnote 1") after each unit to establish knowledge, including a test with additional rewards which count towards the students' continuous evaluation. As a games-based learning tool we use kahoot!, which is the most used app in teaching languages and is easily accessible from the mobile phone. We design multiple choice questions, due to the immediacy of the answering procedure and because they make the students aware of why their knowledge and beliefs may be incorrect (Blackwood, 2013). The subject in which we carry out our experiment is Financial Accounting I, since Accounting, especially at the beginning, represents a new language for the students and in this sense, it can be compared to learning a language. In fact, previous studies have shown the effectiveness of games-based learning in teaching Accounting (Bai, Hew, & Huang, 2004). Due to the high dropout rates in the Business Studies Degree, we distinguish between students who are enrolled for the first time or for subsequent enrolments. This allows us to assess the effect of our experiment on the group of students that, in comparison to those from the first enrolment, have a higher number of students who show some interest for studying and do not want to abandon the Degree, that is, they are interested in continuing with their studies.

In addition, we examine the effect of games-based learning in a different context, the Degree in Economics, which has some important differences with the Degree in Business Studies in relation to the responsibility of the student towards the degree and the relevance of the Accounting subjects. Specifically, we choose Financial Accounting II, which corresponds to the second year of the Degree in Economics, with the same teacher as that of the Business Studies Degree, so her teaching procedure and assessments follow the same pattern. However, the entry profile of the Economics students is different to that of the Degree in Business studies: Economics, contrary to Business Studies, is a first-choice degree for the students, so it is a more vocational degree, while in Business Studies there are many students that cannot opt for other degrees that require higher marks. Consequently, the satisfaction of the students with the Degree in Economics is usually higher than that of the students of Business Studies. The dropout rate is also lower in Economics and second year students are logically those that want to continue with their studies. Thus, we consider this group to be more motivated for learning than the group of Business Studies. Notwithstanding, Accounting has less relevance in the Economics Degree than in the Business Studies Degree in relation to the number of Accounting subjects and their teaching credits (ECTS), which may result in Economics students having a negative perception towards this subject (Lucas, 2001; Mladenovic, 2000; Lucas & Meyer, 2005). That is to say, even with more motivation towards the degree, the motivation towards Accounting is not so high as the motivation for other subjects, such as Macroeconomy and Microeconomy. Table 1 shows the results of the final exam in January (first call) of the academic years 2019-2020 and 2020-2021.

Table 1. Results of Financial Accounting I in the Degree in Business Studies

Academic Year	Students enrolled	First enrolment	Subsequent enrolments	Take the final exam (January)	Continuous evaluation (over 3)	Pass the final exam (January)	% Success
2019-2020	83	64	19	57	1.04	16	28.07%
2020-2021	80	55	25	57	1.46	18	31.58%

As we can see, the inclusion of interventions and rewards in the academic year 2020-2021 does not have an influence on the percentage of the students that take the final exam. Regarding the success rate, there is little improvement. Table 2 displays the results for two categories: those students that enrol for the first time and those of subsequent enrolments.

Table 2. Results of students of first and subsequent enrolments. Financial Accounting I. Degree in Business Studies

Panel A. Academic year 2019-2020

	Continuous evaluation (over 3)	Take the exam (January)	Take the exam /enrolled	Pass the exam	% Success
First enrolment	1.02	49	76.56%	13	26.53%
Rest	1.06	8	42.11%	3	37.5%

Panel B. Academic year 2020-2021

	Continuous evaluation (over 3)	Take the exam (January)	Take the exam /enrolled	Pass the exam	% Success
First enrolment	1.45	39	70.91%	8	20.51%
Rest	1.47	19	76%	10	52.63%

Those students that enrol for at least a second time in the subject supposedly have more interest in continuing with their studies, since they have not abandoned the Degree despite the cost of enrolment being higher after the first enrolment. The descriptive findings show that in both categories there is an improvement in the marks for continuous evaluation. It is worth noting that there is an increase in the number of students of second and subsequent enrolments that take the exam and that the academic performance is higher than that of the previous year. However, there is a decrease in both the percentage of students from the first enrolment that take the exam and their rate of success. An in-depth examination of the students enrolled for the first time who failed shows that 54.84% of these students do not have marks in all the continuous evaluation exams. In contrast, all the students from first enrolment that passed have marks for continuous evaluation. Table 3 shows the results in Financial Accounting II in the Economics Degree.

Table 3. Results of Financial Accounting II in the Degree in Economics

Academic year	Students enrolled	First Enrolment	Subsequent enrolments	Continuous evaluation	Take the exam (January)	Take the exam/ enrolled	Pass the exam	% Success
2019-2020	101	46	55	1.23	40	39.60%	10	25%
2020-2021	105	73	29	1.63	45	42.86%	27	44.44%

In this case, the average marks from the continuous evaluation have increased in 2020-2021 in comparison with the previous academic year (a 20.4% increase for students from the first enrolment and an increase of 37.2% for students from second and subsequent enrolments) and the rate of success is much higher (44.44% vs. 25%). Table 4 examines the results by first and subsequent enrolments.

Table 4. Results of students of first and subsequent enrolments. Financial Accounting II. Degree in Economics

Panel A. Academic year 2019-2020

	Continuous evaluation	Take the exam (January)	Take the exam /enrolled	Pass the exam	% Success
First enrolment	1.37	18	39,13%	5	27.77%
Second and subsequent enrolments	1.12	22	40%	5	22.73%

Panel B. Academic year 2020-2021

	Continuous evaluation	Take the exam (January)	Take the exam /enrolled	Pass the exam	% Success
First enrolment	1.65	35	47,94%	20	57.14%
Second and subsequent enrolments	1.55	10	34,48%	7	70%

Games based learning in the academic year 2020-2021 has increased the average marks of the continuous evaluation and especially the rate of success (from 27.77% to 57.14% in the students of first enrolment and from 22.73% to 70% in the students of second and subsequent enrolments). Thus, in this second group the improvement in the academic performance seems to be very significant. Thus, it is in the groups of first and second enrolments where the effect of games-based learning seems to be higher. This is confirmed by the results shown in table 5, which shows the difference of proportions according to the enrolments (first and subsequent, respectively), in each of the degrees examined.

Table 5. Test of differences of proportions

	2020-2021 vs. 2020-2019			
	Business Studies		Economics	
	z	pvalue	z	pvalue
First enrolment	0.67	0.32	2.18	0.037
Rest	0.73	0.30	2.78	0.008

We fail to find significant differences between those of first enrolment and those of subsequent enrolments in the Business Degree. Thus, although the descriptive statistics suggest an improvement due to games-based learning in those students enrolled for second and subsequent times, we cannot verify this at conventional levels of statistical significance. We find a significant improvement in the proportion of success in both the students of first enrolment (at 5%) and those of second and subsequent enrolments (at 1%), which confirms that it is in the groups of first and second enrolments where the effect of games based learning seems to be higher. If we extend the analysis to differentiate the second from the third or further enrolments, the average marks in continuous evaluation are 1.68 for those students with two enrolments, and 0.995 for those students with three or more enrolments. Students who have enrolled three or more times are sometimes students who take different subjects with overlaps in timetables and that do not take the continuous evaluation in the same degree course as the rest, discarding some exams, so the study habits motivated by the games-based learning are not as assimilated as in the other groups. Therefore, these results suggest that games-based learning improves the interest of the students for the subject and consequently their performance in the subject, although the results are much higher when the students have some kind of interest and motivation in their Degree, which is consistent with the findings of Sardone and Devlin-Schere (2010).

4. Conclusions

In this paper we have examined whether the introduction of games-based learning in teaching activities helps to improve the motivation and the performance of the students. We have focused on Financial Accounting in the degrees in Business Studies and Economics and we have used kahoot! as a games-based learning tool, accessible on students' mobile phones, to design multiple-choice questions after each unit that form part of the continuous evaluation for the semester in each subject.

Our findings show that in Financial Accounting I in the Business Studies Degree, which corresponds to the first academic year, there is not a significant improvement in the performance of the students, although those that enrol for second and subsequent occasions in the subject show better descriptive results than those that enrol for the first time, although they are not significant at conventional levels. In contrast, in Financial Accounting II in the Degree in Economics the improvement is very high, especially in those students who have enrolled for a second time in the subject. Considering the characteristics of the different degrees, Business Studies being less vocational and Economics more vocational but in which Accounting plays a less important role, our findings suggest that games-based learning contributes to motivate those students that have an extrinsic motivation. Effectively, Financial Accounting II is not a subject that motivates the students of the Economics Degree but it is in this setting where we find a significant improvement in the students' performance using games based learning. However, in the Business Degree, where Financial Accounting I is a fundamental subject, the general lack of motivation of the students towards the Degree seem not to be improved by games based learning even in those students that are more familiar with the degree, i.e. those that enrol for a second time.

Nevertheless, from another point of view, these findings may also be interpreted as underlining the mobile phone as being a fundamental tool for the learning process, due to its easy access and permanent link to the student, whereas complex texts and books require a higher autonomy and effort of concentration which are more difficult tasks in a world where the students are used to the immediacy of information.

There are also some shortcomings in this study. One is that our games-based learning experiment takes places in the academic year 2020-2021, which is that of the Covid crisis, and this may have affected the students' performance and motivation. Anyway, assuming that the external effect was similar in both Degrees, Business and Economics, our findings suggest that it is in the latter where games-based learning is more effective. Even if the Covid crisis has reduced the scarce motivation in normal conditions of the students of the Business Degree, which is a more likely hypothesis than the inverse one – an increase in their motivation−, our descriptive findings show better marks for those of second and subsequent enrolments.

References

Adelman, C. (1999). *Answer in the Tool Box: Academic Intensity*. Attendance Patterns and Bachelor´s Degree Attainment. US Department Education. https://www2.ed.gov/pubs/Toolbox/index.html

Arquero, J. L., & Polvillo, C. F. (2019). Estereotipos contables. Motivaciones y percepciones sobre la contabilidad de los estudiantes universitarios de Administración de Empresas y Finanzas y Contabilidad: Accounting stereotypes. Business and accounting students' motivations and perceptions of accounting. *Revista de Contabilidad-Spanish Accounting Review, 22*(1), 88-99. https://doi.org/10.6018/rc-sar.22.1.354341

Arquero, J. L., Fernández-Polvillo, C., & Hassall, T., Joyce, J. (2015). Vocation, motivation and approaches to learning: a comparative study. *Education+ Training, 57*(1), 13-30. https://doi.org/10.1108/ET-02-2013-0014

Arquero, J.L., Byrne, M.; Flood, B., & González, J.M. (2009). Motives, expectations, preparedness and academic performance: a study of students of accounting at a Spanish university. *Revista de Contabilidad - Spanish Accounting Review, 12*(2), 279-300. https://doi.org/10.1016/S1138-4891(09)70009-3

Arquero, J.L., Donoso, J.A., & Seltzer, J.C. (2006). Diagnóstico de las causas de motivación en los estudiantes de contabilidad. *La Revista Electrónica Arbitrada, Innovaciones en Docencia e Investigación en Ciencias Económico Administrativas (REAIDICEA), 4*(15), 183-214.

Bai, S., Hew, K. F., & Huang, B. (2020). Does gamification improve student learning outcome? Evidence from a meta-analysis and synthesis of qualitative data in educational contexts. *Educational Research Review, 30*, 100322. https://doi.org/10.1016/j.edurev.2020.100322

Baquiran, A. L. (2011). Study Habits and Attitudes of Freshmen Students: Implications for Academic Intervention Programs. *Journal of Language Teaching and Research, 2*(5), 1116-1121. https://doi.org/10.4304/jltr.2.5.1116-1121

Blackwood, T. (2013). Business undergraduates' knowledge monitoring accuracy: how much do they know about how much they know? *Teaching in Higher Education, 18*(1), 65-77. https://doi.org/10.1080/13562517.2012.694100

Boyle, R., Carter, J., & Clark, M. (2002). What makes them succeed? Entry, progression and graduation in computer science. *Journal of Further and Higher Education, 26*(1), 2-18. https://doi.org/10.1080/03098770120108266

Byrne, M., & Flood, B. (2005). A study of accounting students' motives, expectations and preparedness for higher education. *Journal of Further and Higher Education, 29*(2), 111-124. https://doi.org/10.1080/03098770500103176

Byrne, M., Flood, B., & Griffin, J. (2014). Measuring the academic self-efficacy of first-year accounting students. *Accounting Education, 23*(5), 407-423. https://doi.org/10.1080/09639284.2014.931240

Byrne, M., Flood, B., Hassall, T., Joyce, J., Montano, J. L. A., Gonzalez, J. M. G., & Tourna-Germanou, E. (2012). Motivations, expectations and preparedness for higher education: A study of accounting students in Ireland, the UK, Spain and Greece. *Accounting Forum, 36*(2), 134-144. https://doi.org/10.1016/j.accfor.2011.12.001

Carenys, J., & Moya, S. (2016). Digital game-based learning in accounting and business education. *Accounting Education, 25*(6), 598-651. https://doi.org/10.1080/09639284.2016.1241951

Cerna, M.A., & Pavliushchenko, K. (2015). Influence of Study Habits on Academic Performance of Intenational College Students in Shanghai. *Higher Education Studies, 5*(4), 42-55. https://doi.org/10.5539/hes.v5n4p42

Credé, M., & Kuncel, N.R. (2008). Study Habits, Skills and Attitudes: The Third Pillar Supporting Collegiate Academic Performance. *Perspectives on Psychological Science, 3*(6), 425-453. https://doi.org/10.1111/j.1745-6924.2008.00089.x

Credé, M., & Niehorster, S. (2012). Adjustment to College as Measured by the Student Adaptation to College Questionnaire: A Quantitative Review of its Structure and Relationships with Correlates and Consequences. *Educational Psychology Review, 24*, 133-165. https://doi.org/10.1007/s10648-011-9184-5

Davies, M.A., Tikoo, S.;Ding, J., & Salama, M. (2016). Motives Underlying the Choice of Business Majors: A Multicountry Comparison. *International Journal of Management Education, 14*(1), 50-61. https://doi.org/10.1016/j.ijme.2016.01.001

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality, 19*(2), 109-134. https://doi.org/10.1016/0092-6566(85)90023-6

Deci, E. L., & Ryan, L.M. (2000). The "What" and "Why" of Goal Pursuits: Human Needs and the Self-Determination of Behavior. *Psychological Inquiry, 11*(4), 227-268. https://doi.org/10.1207/S15327965PLI1104_01

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining gamification. *In Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments,* 9-15. https://doi.org/10.1145/2181037.2181040

Fiorella, L. (2020). The science of habit and its implications for student learning and well-being. *Educational Psychology Review*, 1-23. https://doi.org/10.1007/s10648-020-09525-1

Fisher, C. D. (1978). The effects of personal control, competence, and extrinsic reward systems on intrinsic motivation. *Organizational Behavior and Human Performance, 21*, 273-288. https://doi.org/10.1016/0030-5073(78)90054-5

Fox, A., Stevenson, L., Connelly, P., & Duff, Dunlop, A. (2010). Peer-mentoring undergraduate accounting students: The influence on approaches to learning and academic performance. *Active Learning in Higher Education, 11*(2), 145-156. https://doi.org/10.1177/1469787410365650

Freixa Niella, M., Llanes, J., & Venceslao, M. (2018). El abandono en el recorrido formativo del estudiante. El caso de ADE de la Universidad de Barcelona. *Revista de Investigación Educativa, 36*(1), 185-202. https://doi.org/10.6018/rie.36.1.278971

Hakyemez, T.C., & Mardikyan, S. (2021). The Interplay between Institutional Integration and Self-Efficacy in the Academic Performance of First-Year University Student: A Multigroup approach. *The International Journal of Management Education, 19*(1), 100430. https://doi.org/10.1016/j.ijme.2020.100430

Kane, S., Chalcraft, D., & Volpe, G. (2014). Notions of Belonging: First Year, First Semester Higher Education Students Enrolled on Business or Economic Degree Programs. *The International Journal of Management Education, 12*(2), 193-201. https://doi.org/10.1016/j.ijme.2014.04.001

Koivisto, J., & Hamari, J. (2014). Demographic differences in perceived benefits from gamification. *Computers in Human Behavior, 35*, 179-188. https://doi.org/10.1016/j.chb.2014.03.007

Kusurkar, R., Croiset, G., Olle, T., & Ten, C. (2011). Twelve tips to stimulate intrinsic motivation in students through autonomy-supportive classroom teaching derived from Self- Determination Theory. *Medical Teacher, 31*, 978-982. https://doi.org/10.3109/0142159X.2011.599896

Lally, P., & Gardner, B. (2013). Promoting habit formation. *Health Psychology Review, 7*(sup1.), 137-158. https://doi.org/10.1080/17437199.2011.603640

Lucas, U. (2001). Deep and surface approaches to learning within introductory accounting: a phenomenographic study. *Accounting Education, 10*(2), 161-184. https://doi.org/10.1080/09639280110073443

Lucas, U., & Meyer, J. H. (2005). 'Towards a mapping of the student world': the identification of variation in students' conceptions of, and motivations to learn, introductory accounting. *The British Accounting Review, 37*(2), 177-204. https://doi.org/10.1016/j.bar.2004.10.002

MacNamara, D., & Murphy, L. (2017). *Online versus offline perspectives on gamified learning*. GamiFIN Conference, University Consortium of Pori, Finland. http://ceur-ws.org/Vol-1857/gamifin17_p7.pdf

Mladenovic, R. (2000). An investigation into ways of challenging introductory accounting students' negative perceptions of accounting. *Accounting Education, 9*(2), 135-155. https://doi.org/10.1080/09639280010000147

Montes Iturrizaga, I. (2012). Longitudinal research of the study habits in a cohort of university students. *Revista Lasallista de Investigación, 9*(1), 96-110.

Nonis, S.A., & Hadson, G.I. (2010). Performance of College Students: Impact of Study Time and Study Habits. *Journal of Education for Business, 85*, 229-238. https://doi.org/10.1080/08832320903449550

Ozga, J., & Surhanandan, I. (1998). Undergraduate non-completion: developing an explanatory model. *Higher Education Quarterly, 52*(2), 316-333. https://doi.org/10.1111/1468-2273.00100

Pardo Merino A., & Alonso Tapia, J. (1990). *Motivar en el aula*. Servicio de Publicaciones de la Universidad Autónoma de Madrid. Madrid

Pascarella, E. T., Smart, J.C., & Ethington, C.A. (1986). Long-term persistence of two-year college students. *Research in Higher Education, 24*(1), 47-71. https://doi.org/10.1007/BF00973742

Raab, L., & Adams, J. (2005). The University College Model: a Learning-Centered Approach to Retention and Remediation. *New Directions for Institutional Research*, 87-106. https://doi.org/10.1002/ir.141

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: an extension of cognitive evaluation theory. *Journal of Personality and Social Psychology, 43*, 450-461. https://doi.org/10.1037/0022-3514.43.3.450

Ryan, R.M., & Deci, E.L. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology, 25*, 54-67. https://doi.org/10.1006/ceps.1999.1020

Sardone, N.B., & Devlin-Schere, R. (2010). Teacher Candidate Responses to Digital Games: 21st-Century Skills Development. *Journal of Research on Technology in Education, 42*(4), 409-425. https://doi.org/10.1080/15391523.2010.10782558

Shaunessy-Dedrick, E., Suido, S.M., Roth, R.A., & Fefer, S.A. (2015). Students' Perceptions of Factors that Contribute to Risk and Success in Accelerated High School Courses. *High School Journal, 98*(2), 109-137. https://doi.org/10.1353/hsj.2015.0002

Silva, R., Rodrigues, R., & Leal, C. (2019). Play it again: how game-based learning improves flow in accounting and marketing education. *Accounting Education, 28*(3), 1-24. https://doi.org/10.1080/09639284.2019.1647859

Silva, R., Rodrigues, R, & Leal, C. (2021). Games based learning in accounting education-which dimensions are the most relevant? *Accounting Education, 30*(2), 159-187. https://doi.org/10.1080/09639284.2021.1891107

Tinto, V. (1987). Colleges as communities: Exploring the educational character of student experience. *Journal of Higher Education, 68*(6), 599-623. https://doi.org/10.1080/00221546.1997.11779003

Turner, M., & Baskerville, R. (2013). The experience of deep learning by accounting students. *Accounting Education, 22*(6), 582-604. https://doi.org/10.1080/09639284.2013.847323

Voshaar, J., Knipp, M., Loy, T., Zimmermann, J., & Johannsen, F. (2022). The impact of using a mobile app on learning success in accounting education. *Accounting Education,* forthcoming. https://doi.org/10.1080/09639284.2022.2041057

Wood, W., & Rüngers, D. (2016). Psychology of Habit. *Annual Review of Psychology, 67*, 289-314. https://doi.org/10.1146/annurev-psych-122414-033417

Wooten, T.C. (1998). Factors influencing student learning in introductory accounting classes: a comparison of traditional and non-traditional students. *Issues in Accounting Education, 13*(2), 357-373.

Wolters, C.A., & Brady, A.C. (2021). College Students´Time Management: A Self-Regulated Learning Perspective. *Educational Psychology Review, 33*, 1919-1351. https://doi.org/10.1007/s10648-020-09519-z

Notes

Note 1. Gamification is the process of applying game elements in a non-game context in order to motivate learner behaviour. (Deterding, Dixon, Khaled and Nacke, 2011) or, rather "the phenomenon of creating gameful experiences" (Koivisto & Hamari, 2014).