

Are Students' Effort in Business Courses Related to the Choice of Exam Forms?

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Abstract

The exam is an important tool to measure students' skills. However, the choice of exam form also affects the way students acquire knowledge. In this study, the focus is on the link between the students' study efforts and the choice of exam type. By asking students at a business school in Norway, we will identify factors that affect students' efforts. As a research instrument, personality traits (the Big Five) are used. By applying a linear regression model, this research demonstrates that there is a close correlation between motivation and learning methods, as well as with study effort. The impact varies with the choice of exam form. Gender and personal characteristics also influence the students' efforts to some extent, depending on the type of exam. This is useful knowledge in the evaluation of different forms of examination.

Keywords: Business school, Big Five, Assessments, Study effort, Gender, Learning approach

Introduction

Student efforts are a key factor in creating useful learning environments and probably also for achieving good performance. Several studies suggest that the hours per week undergraduates at business schools spend studying is around 30 (Bonesronning & Opstad, 2012; Nonis et al., 2006). New technology provides far more opportunities in the choice of learning methods than before. Access to the Internet allows the mass production of students by using online teaching. The question also arises of which form of examination to choose.

The spotlight in this article is directed at how different forms of exams can affect student effort. This is an important issue in shaping future programmes for business students.

The Big Five

An important instrument in this study is the use of the Big Five personality traits (McCrae & Costa, 1987; O'Connor & Paunonen, 2007). This method consists of five factors (Conscientiousness, Agreeableness, Extraversion, Openness, and Emotional stability). Conscientiousness is associated with people who are well organized, effective, and target orientated. Agreeableness means being helpful, avoiding conflict, and being cooperative. Extraversion is associated with individuals who are outgoing and who value social contact. Openness is associated with people who are creative, and who seek new solutions and ideas. Emotional Stability is associated with people who are emotionally stable, for instance they are not troubled with anxiety.

Literature review **and** hypothesis

Study time may be a crucial factor in academic success. Stinebrickner and Stinebrickner (2008) find that an hour's extra study time has a substantial impact on students' performance. Other researchers confirm this result among business and economics students (Andrietti & Velasco, 2015; Bonesronning & Opstad, 2012). There may be individual differences in how much time the student allocates to their study (Opstad, 2021a). A student has limited time, and this will be allocated to various activities (Correa & Gruver, 1987). Normally a student attends three to four courses during a semester. The study time spent on a specific course varies depending on many factors (Needham, 1978): motivation, ability, interests, student characteristics, teaching methods, grading system, and assessment format. A change in one of these factors will affect the efforts of the individual subject. There are probably considerable differences among the students. Bonesronning and Opstad (2015) report that if students achieve lower performance than expected in a course during a mid-semester test, they will increase their study effort. Harder grading practice might motivate some students to study more in order to reach the desired grade, while other students find that the desired grade is unattainable, and give up, or reduce their effort. A student with high academic skills may find the subjects easy to learn. Hence, one student can achieve good grades without so much effort, while other students who struggle to understand the subject

might spend many hours catching up in order to achieve the desired level of knowledge. Some researchers suggest that female students tend to study more compared to males (Hadsell, 2020; Opstad et al., 2013).

Bidjerano and Dai (2007) argue there is a connection between personality traits and learning strategy. Conscientiousness, Agreeableness, and Emotional Stability are positively related to study effort. Students with high scores in Conscientiousness are time efficient, and focus on success. Komarraju and Karau (2005) report a positive relationship between students' engagement and the two factors Openness and Extraversion. Opstad (2021b) finds a positive link between study effort among business students and the two factors of Conscientiousness and Openness. Additionally, Conscientiousness, Openness, and Extraversion are also positively correlated with students' motivation (Hart et al., 2007). Fuertes et al. (2020) report a substantial positive link between Openness and motivation with the highest scores for female students.

Fraser and Killen (2005) argue motivation and study effort are closely connected. Unmotivated students tend to deprioritise their studies. There is a shortage of time, and they will prioritise using the time for other tasks. This will turn out to have a negative effect on performance. Hence, students' motivation is an important factor for achieving success and acquiring knowledge (Goodman et al., 2011; Kusurkar et al., 2013). Motivation is also a critical factor for students' learning (Kim et al., 2015). Students' motivation and belief have a direct impact on students' learning approach. Lack of motivation will have a negative effect on the desire to learn more about a subject (Gao et al., 2011). On the other hand, increased learning and interest in a subject will have a positive impact on motivation and effort (Susanty et al., 2021).

The relationship between study time and business students' performance is complex (Noris & Hudson, 2010). It is not obvious that the link is positive. Krohn and O'Connor (2005) report a negative link between these two variables. One weakness of many analyses is that they only look at the time spent, and do not consider how the time is spent. Elias (2005) distinguishes between time spent on deep and superficial learning in accounting subjects. For the deeper approach, he suggests a positive link between study time and success.

Motivation is strongly linked to academic performance (Hidi & Harakiewicz, 2000; Nonis & Hudson, 2010). This is a vital component of enabling the students to reach their personal goals. Students with high motivation tend to be more engaged in schoolwork, and have more interest in their topics (Fredricks et al., 2004). Hence, there is a positive correlation between motivation and attendance at the lectures (Opstad et al., 2013).

The research shows that female students tend to study and attend lectures more (Hadsell, 2020). Data from Norway confirms this tendency (Bonesronning & Opstad, 2012; Opstad, 2021a). Perhaps, to a greater extent than men, women do not want to miss the lectures, and they have less expectation of success (Ballard & Johnson, 2005). Therefore, they think they must study harder to achieve their goals. It seems that women have less self-confidence in the study of economics and business. However, studies report there are no gender differences in performance among business students in Norway (Opstad, 2021b, 2022).

Different teaching and evaluation methods are related to students' effort and learning approach (Weitzel, 1977). Utilising online teaching and home-based assessments have influenced learning methods and students' effort (Peimani & Kamalipour, 2021). According to Dumford and Miller (2021), remote teaching engenders less student engagement and collaboration. This will disadvantage the students who like to collaborate and have discussions with their fellow students. It can also have a negative effect on motivation and learning for lonely students who have a limited network. Online teaching and home-based exams become challenging due to limited social interaction (Ilias et al., 2020). This effect will vary from student to student.

The traditional form of exams (essays with closed book) requires the highest level of study-work. According to Asikainen et al. (2013), students with a deep learning approach prefer Constructed -Response test (CRT), while students who focus on facts and memories, and apply a more surface approach, tend to favour Multiple-Choice (MC) based tests. CRT contents different kind of questions (for instance long answer questions) and the examinees must response by using their own words.

Zeidner (1987) has used questioning to investigate high school students' experiences of comparing multiple-choice to essay format exams. Students are divided in their views. Many argued that essays reflected students' knowledge and abilities to a greater extent than multiple-choice (MC) tests. However, around 80 per cent of the students considered

multiple choice exams to be easier to answer, and the majority prefer this form of exam between the two. They believe that the chance to get a good grade is greatest with the multiple-choice exam. Other researchers confirm this conclusion (Struyven et al., 2005). These factors will influence the students' study time.

Bengtsson (2019) reports that changing from school-based tests with closed book to home-based tests with open book will change study habits. However, the research is mixed on this. Some authors argue students will increase their effort (Rich et al., 2014), while others claim that the students will study less (Moore & Jensen, 2007). However, a problem with home-based assessments is that some students may be tempted to engage in unethical behaviour. According to Bengtsson (2019), many students favour home-based exams, as they believe they increase the chance of achieving better grades.

Depending on their purposes and goals, the universities and colleges choose different kinds of assessment (Birenbaum, 1996, 2007) If the school focusses on justice and equal treatment, one might prefer multiple choice exams.

Hypothesis

Based on previous research and the literature review, we will postulate six hypotheses in this study:

H1: Students' response in terms of effort for different assessments is gender related.

H2: There is correlation between study effort and personality traits, depending on the exam format.

H3: Expected success is positively related to study effort, independent of exam format.

H4 Students' motivation is positively related to study effort, independent of exam format.

H5: Learning approach is positively related to study effort, independent of exam format.

H6: Emphasis on understanding of the subjects is positively related to study effort, independent of exam format.

Several research papers conclude women spend more time on their studies than their male counterparts (Ballard & Johnson, 2005; Opstad, 2021a). In this study we focus on how students will change behaviour depending on the assessments and gender. Females tend to respond less of incentives than males (Liu et al., 2022). They react to a lower degree and a different kind of reward system. Therefore, the nature of the gender impact is not obvious in this study.

In terms of personal characteristics, many report this has an impact on students' interest and efforts, but which factors are significant varies somewhat. Therefore, we leave hypothesis 2 more open, but assume that personality traits matter.

The research suggests that motivation, expected achievements, sounding methods and emphasis on understanding in the subjects are positively correlated with effort. in hypotheses 3 to 6, it is assumed that this effect applies regardless of the form of the exam.

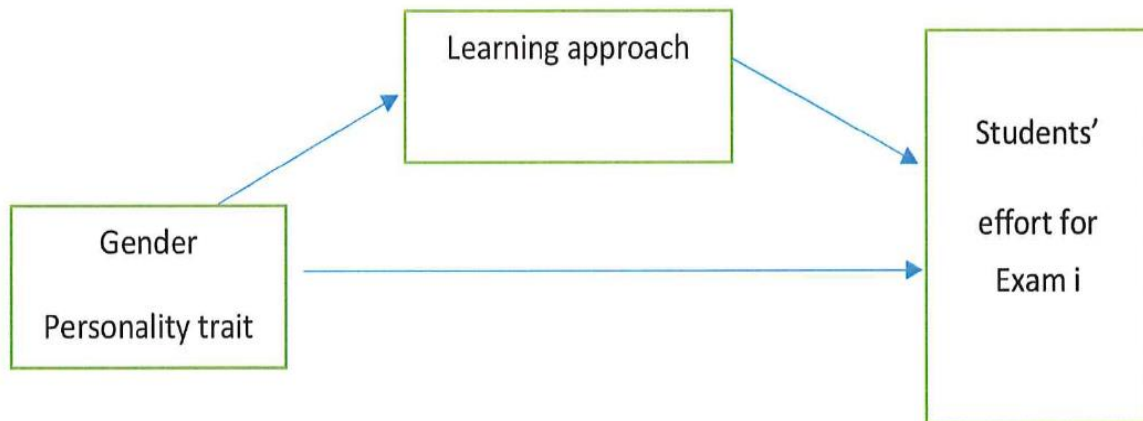


Figure 1: The link between gender, personality traits, learning approach, and study time for different exam formats (multiple-choice test, constructive response test, oral based exam, and home-based tests)

Methodology and data

The sample

This survey consists of approximately 100 undergraduates at the Norwegian University of Science and Technology (NTNU) Business School. The questionnaire was sent to the students during a second-year compulsory course (macroeconomics) in 2020. The data is not randomly chosen, as they cover only 40 per cent of the students. Due to COVID-19, there were few students on campus. This was compensated for by the digital collection of the questionnaire, but many students did not choose to respond. Nevertheless, the survey gives a picture of the attitudes among the students.

The Model

Following linear regression model is used in this research (see Figure 1):

$$Y_i = a_0 + a_1X_i + a_2X_2 + a_3X_3 + a_4X_4 + a_5X_5 + a_6X_6 + a_7X_7 + a_8X_8 + a_9X_9 + a_{10}X_{10} + a_{11}X_{11} + a_{12}X_{12} + a_{13}X_{13} + \epsilon$$

where:

- Y_i: Study time for exam i (I will study hard with this assessment) (Likert scale 1 to 7)
- i= Multiple choice test (MCT), Constructive response test (CRT), Oral-based test (OBT), Home-based test with letter grades (HBTg), Home-based test with pass/ fail (HBTp).
- a₀: Constant
- X₁: Gender (0:F, 1:M)
- X₂: Openness (Likert scale 1 to 5)
- X₃: Emotional Stability (Likert scale 1 to 5)
- X₄: Conscientiousness (Likert scale 1 to 5)
- X₅: Agreeableness (Likert scale 1 to 5)
- X₆: Extraversion (Likert scale 1 to 5)
- X₇: Performance (I I will have success) ((Likert scale 1 to 7)
- X_s: Anxiety (I have high anxiety) (Likert scale 1 to 7)
- X₉: Learning Approach (It provides good learning) (Likert scale 1 to 7)
- X₁₀: Motivation (The test motivates) (Likert scale 1 to 7)
- X₁₁: Learning style (It affects the way I acquire knowledge) (Likert scale 1 to 7)
- X₁₂: Fairness (The test gives fair ranking) (Likert scale 1 to 7)

X13: Understanding (I emphasize understanding) (Likert scale 1 to 7)
 s: stochastic error

In this study we present two models with different sets of variables. In model 1 gender and only personality traits enter as independent variables. In model 2, all variables are included. We want to study whether the expanded model with several control variables affects the impact of gender and personal characteristics (see Figure 1).

Some of the control variables (fairness, anxiety, and learning style) are not included in the hypotheses.

This survey has no access to experimental data. Therefore one should be careful to draw conclusions about causal relationships, Causalities can go either way. Aspirations for success influence the study effort, and that will have an impact on performance. Similar reasoning applies to several of the variables.

The data

There are substantial differences in students' report about the different factor of behaviour depending on selection of assessments (Table 1). The undergraduates expect highest performance with home-based exams. Students become significantly more nervous during traditional school exams and oral exams. There is rather scant variation in the mean value of personality traits, they are all bet 3.2 and 5.0 ween (See Table 2). Most of the students are female (55 percent).

Table 1. Descriptive statistics (7 point Likert scale, 1: strongly disagree, 7: strongly agree, standard deviation in parenthesis, N around 100)

	MCE	CRE	HBEg	HBEp	OBE
Study time (I will do a lot of studying for this test)	4.2 (1.5)	5.5 (1.3)	5.4 (1.4)	3.1 (1.3)	5.1 (1.3)
Success (I will have success with this test)	5.0 (1.2)	4.4 (1.5)	5.2 (1.2)	-	4.3 (1.4)
Learning Approach (It provides good learning)	4.2 (1.3)	5.0 (1.3)	5.0 (1.4)	3.4 (1.6)	4.8 (1.4)
Fairness (The test gives a fair ranking)	4.0 (1.6)	4.9 (1.5)	4.0 (1.9)	3.5 (1.9)	4.1 (1.8)
Motivation (The test motivates me)	4.1 (1.5)	4.6 (1.5)	4.9 (1.5)	3.1 (1.5)	4.4 (1.6)
Anxiety (I have anxiety connected to the test)	2.6 (1.5)	4.9 (1.7)	3.3 (1.6)	2.5 (1.6)	5.9 (1.7)
Learning Style (The test affects the way I acquire knowledge)	4.8 (1.6)	5.2 (1.7)	5.3 (1.4)	5.0 (1.7)	5.4 (1.6)
Understanding (I emphasise understanding with this test)	4.3 (1.7)	5.3 (1.5)	5.1 (1.7)	3.7 (1.6)	5.6 (1.3)

Table 2. Descriptive data. Gender and Personality traits (5 point Likert scale):

	Mean	St.dev.
Gender (1: M, 0:F)	.45	1.50
Openness	3.28	.72

Emotional Stability	3.44	.72
Consciousness	3.81	.71
Agreeableness	3.98	.65
Extraversion	3.59	.79

Findings

There is no gender effect for multiple choice-based exam and oral-based exams (see Tables 3a-3b). For constructed response and home-based tests, there is a significant gender gap with the highest values for males. The effect is strongest in model 2. Hypothesis 1 is partly confirmed.

The correlations of students' responses in their efforts in relation to different exam forms linked to personality traits are rather weak, but there are some impacts. Consciousness is negatively related to MCT, but only significantly in model 1. Furthermore, this factor is significantly positively related to HBEG (model 2). Emotional Stability is negatively correlated to effort for oral-based exams (model 2). Agreeableness is significantly positively associated with effort for home-based tests (model 1). For HBEG, there is also a significant negative impact for Extraversion (model 2). Hypothesis 2 is partly confirmed.

Expected success is not linked to effort (cf. Table 3a and 3b). Hypothesis 3 is rejected.

Motivation is positively correlated with effort for all exam formats, except for CRT. Hence, hypothesis 4 is not confirmed.

Learning approach is linked to study effort, except for MCT. Emphasis learning has a positive relationship with the dependent variable for CRT, OBT, and HBEp. Hypotheses 5 and 6 are not confirmed.

For Anxiety and Fairness, there is some impact in some of the assessments. Anxiety is positively related applying CRT and HBTg, while fairness is positively related using constructive response test, and negatively for home-based tests with pass/fail.

Table 3a. Results from the regression model for MCT, CRT, and OBT

	MCT				CRT				OBT			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.	B	Sig.	B	Sig.
Gender	.00	.32	-.05	.58	.20	.07*	.20	.002**	.10	.37	-.01	.94
Openness	.17	.12	.02	.80	.06	.60	.01	.88	.08	.48	.02	.76
Emotional Stability	.06	.59	.06	.51	.13	.26	.14	.12	.08	.50	.16	.099*
Consciousness	.21	.08*	-.03	.79	.08	.50	.12	.25	.11	.35	.036	.65
Agreeableness	-.21	.24	.02	.82	.04	.74	.05	.54	-.17	.17	.08	.36
Extraversion	-.11	.32	.02	.79	.07	.55	-.06	.51	.14	.21	-.05	.50
Success			.04	.70			-.06	.63			-.17	.14
Anxiety			.07	.47			.23	.02**			-.06	.48
Learning Approach			.08	.59			.42	.00***			.35	.02**
Motivation			.55	.00***			-.00	.99			.27	.06*
Learning			-.05	.57			.01	.94			.03	.72
Fairness			-.02	.85			.26	.05*			.07	.52
Understanding			.17	.18			.23	.08*			.33	.00***
	N = 89 Adj R ^s = .020		N = 85 Adj R ^s = .438		N = 88 Adj R ^s = .011		N = 83 Adj R ^s = .509		N = 83 Adj R ^s = .056		N = 79 Adj R ^s = .656	

Notes: 1) Acceptable values of VIP (Variable Importance of Projection) d 2 *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standardised coefficients Beta (B) Multiple choice test (MCT), Constructive response test (CRT), Oral-based test (OBT),

Table 3b. Results from the regression model for home-based exams

	HBEg				HBEp			
	Model 1		Model 2		Model 1		Model 2	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.
Gender	.07	.37	.15	.03**	.09	.41	.04	.57
Openness	.03	.78	.07	.37	-.16	.15	-.10	.15
Emotional Stability	.13	.22	.02	.82	.00	.97	.01	.84
Consciousness	.13	.27	.14	.09*	-.01	.94	.07	.27
Agreeableness	.26	.03**	-.04	.58	.25	.03**	-.05	.47

Extraversion	.06	.57	.07	.33	.09	.42	.13	.06
			.13	.10				
Anxiety			.12	.09 *			.08	.21
Learning Approach			.50	.00 ***			.27	.02 **
Motivation			.21	.09 *			.50	.00 ***
Learning Style			.05	.55			.07	.33
Fairness			.08	.34			-.19	.01 **
Understanding			.05	.64			.22	.02 *
	N =88 Adj.Rs=.131		N =88 Adj.Rs =.656		N =87 Adj.Rs =.053		N =81 Adj.Rs =.685	

Notes: 1) Acceptable values of VIP (Variable Importance of Projection). 2) *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standardised coefficients Beta (B)
Home-based test with letter grades (HBTg), Home-based test with pass/ fail (HBTp)

Discussion

Gender

Traditionally, men have performed better than women in economic and business subjects (Ballard & Johnson, 2005; Opstad & Fallan, 2010). However, with more women acquiring education and gender equality, many of the differences seem to have disappeared. Recent studies show no significant gender gap in achievements and attitudes (Opstad, 2020b, 2021b, 2022). Nevertheless, there is a substantial gender gap in changes of behaviour due to incentives (Dalton et al., 2016). This has a greater effect on men than women. This might explain why there is a positive correlation

between gender and study effort for some assessments. For instance, use of constructed response questions stimulates men to a greater extent than women.

Personality traits

Skilled students who are concerned with learning subjects tend to prefer CRT over MCT (Opstad, 2021c, 2021d; Zeidner, 1987). Furthermore, students with high score in Consciousness do not like MC-tests (Opstad, 2020a) as they measure more superficial abilities to read (Singh et al., 2013). This may explain the negative correlation between students' effort and MC tests. When using MC-tests some students are less interested in the subject, and therefore reduce their effort. On the other hand, they will increase their effort with essays and home-based exams. The impact is significant, but not strong (B 14).

Agreeable students like to cooperate with other students. They are not keen on MCT and CRT (Lakhali et al., 2015). They will probably be better facilitated in home-based exams with the use of various means of help. Based on such reasoning, one can expect a positive correlation between effort and home-based exams for this group of students.

By comparing different assessments formats, this analysis shows that personality traits have a small impact on the student's efforts, overall. With the extended model version (Model 2), many of the proven effects disappear.

Other factors

Previous research shows that there is not an unambiguous correlation between student effort and performance. Opstad (2021c) claims there is no correlation between effort (attendance and own effort) and scores in macroeconomics, either for essays or multiple-choice assignments. The explanation is that many other factors matter. Skilled students can achieve desired grades without putting in too much effort. Students who are struggling to understand the subject must work hard to keep up and achieve desired grades. If students think it is easier to get a good grade with MCT and HBTg, this can lead to a decrease in effort. These are factors that may explain why this analysis cannot suggest a positive correlation between expected success and effort at different types of exams.

In line with previous research, there is generally a statistically significant correlation between learning approach, understanding, motivation, and effort. This study shows quite large impacts with high values on standardised beta B (for instance the coefficient is .42 for learning approach applying CRT). The students report different values depending on the form of the exam (cf Table 1). From the regression model we can report a positive link between these independent variables and the dependent variable for the different forms of examination. However, there are some exceptions. For example, only motivation is significantly correlated with MCT, but the influence is strong. One explanation is that the students find that this type of exam provides a more unclear learning approach and understanding in relation to the other types of exams (Krieg & Uyar, 2001). For CRT, the independent variable motivation has no impact.

For the control variables anxiety, learning style, and fairness, it is unclear how these factors relate to effort. Being nervous attending the exam can either lead to extra preparation, or a 'give-up' attitude, and hence reduced effort. In this analysis, there is a positive impact in relation to CRT and HBEG. However, we do not have a similar effect for oral exams. This is the type of exam that students dread the most. The effect may be that many candidates are resigned, to some degree. As expected, anxiety does not affect the preparation (effort) in these exams, with the least anxiety occurring in the case of MCT and IIBEp. A change in the way knowledge is acquired (Learning style) can lead to less, unchanged, or increased effort. In this study, the impact is so small on the effort that it is insignificant.

The link between justice and effort is not obvious. One can expect that if students perceive some forms of exam to be fair, it will increase their efforts and interest in the subject. Conversely, if the student finds the form of the exam to be very unjust, the effort will be reduced. The findings of this research appear to be in line with this reasoning. For the exam that students consider to be most fair, there is a significant positive link between justice and effort (CRT), and for the form of examination that is perceived as least fair, it is negative (HBTp). For the other exam forms, there is no significant statistical impact.

Limitation

Since this survey has only been carried out at a business school in Scandinavia, one should be careful to draw conclusions. Nevertheless, there is every reason to believe that the results of this study have general interest. Another weakness of the survey is the question of the students' assessment, and that it does not observe actual behaviour.

Conclusion and further research

Students' work settings vary according to the type of exam. For example, home exams with a pass/fail grade will mean that the students exert a low level of study effort. Students perceive the traditional school exam (CRT) with few questions to quite fair, but many students are nervous about this type of exam. The regression model shows that males increase their efforts more than the girls in this choice of test.

There are various factors that affect the students' efforts. For most exam forms, there is a positive link between motivation and effort (the exception is CRT). Furthermore, there is a close link between learning approach and effort.

Personality traits also matter, to some degree. Agreeableness is related to cooperation with others. Therefore, it is not surprising that students with high scores in this area, increase their efforts if it is the home-based exam.

Further research could be undertaken to study how different forms of exams would affect students' performance and ranking.

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