

Session on published papers, BAFA AE SIG, 5 May 2017

The relationship between  
**learning approaches**, motivation, time  
spent and **academic performance**.

Accounting Education, 2017, Vol. 26, No. 1

Prof. Dr. Patricia Everaert  
Prof. Dr. Evelien Opdecam  
Prof. dr. Sophie Maussen



“You should study more!”



“I am already studying a lot of time!”

“How do you study?”

“Simply studying!”

“She is not motivated to study!”



- Aim
  - understanding the material
  - long term retention
- Link new knowledge to previous acquired knowledge
- Personal commitment to learning (want to understand the material)
- Study in-dept

Deep learning approach



- Aim
  - reproduction of the material
  - focus on isolated, unlinked facts
- Focus on memorization (learning by heart)
- Only sufficient knowledge to pass the exam

Surface learning approach

# Research questions

## Can we influence the **learning approach**?

- Is high motivation leading to *deep* learning?

## Does the learning approach matter?

- Is deep learning leading to ***higher performance***?
- Is deep learning leading to more ***time spent*** (on studying)?
- Is the impact of deep learning, ***simply because of*** the more time spent?

# Biggs 3 P model

Presage

Learning process

Learning outcomes

**Ability, Gender**

**Motivation**

**Learning approach** — ? — **Performance**  
(deep, surface)

**Time spent**

# Motivation -> Learning Approach

**Intrinsic** motivation: refers to motivation that comes from *inside* an individual (interest, curiosity)

**Extrinsic** motivation: refers to motivation that comes from *external or outside* rewards (grades, money)

(Ryan & Deci, 2000; Lucas, 2001; Säljö, 1979)

H1a: **High intrinsic** motivation results in a more **deep** approach of learning

H1b: **High extrinsic** motivation results in a more **surface** approach of learning

# Learning approach -> Performance

**Deep** learning: in-dept

**Surface** learning: memorization

(Duff, 2004; Jackling 2005)

H2a: A **deep learning approach** results in  
*higher* academic performance

H2b: A **surface learning approach** results in  
*lower* academic performance

# Learning Approach -> Time spent

## Scarce empirical literature

(Doumen et al., 2014: self-study time)

H3a: A **deep learning approach** results in *higher* time spent by the student.

H3b: A **surface learning approach** results in *low* time spent by the student.

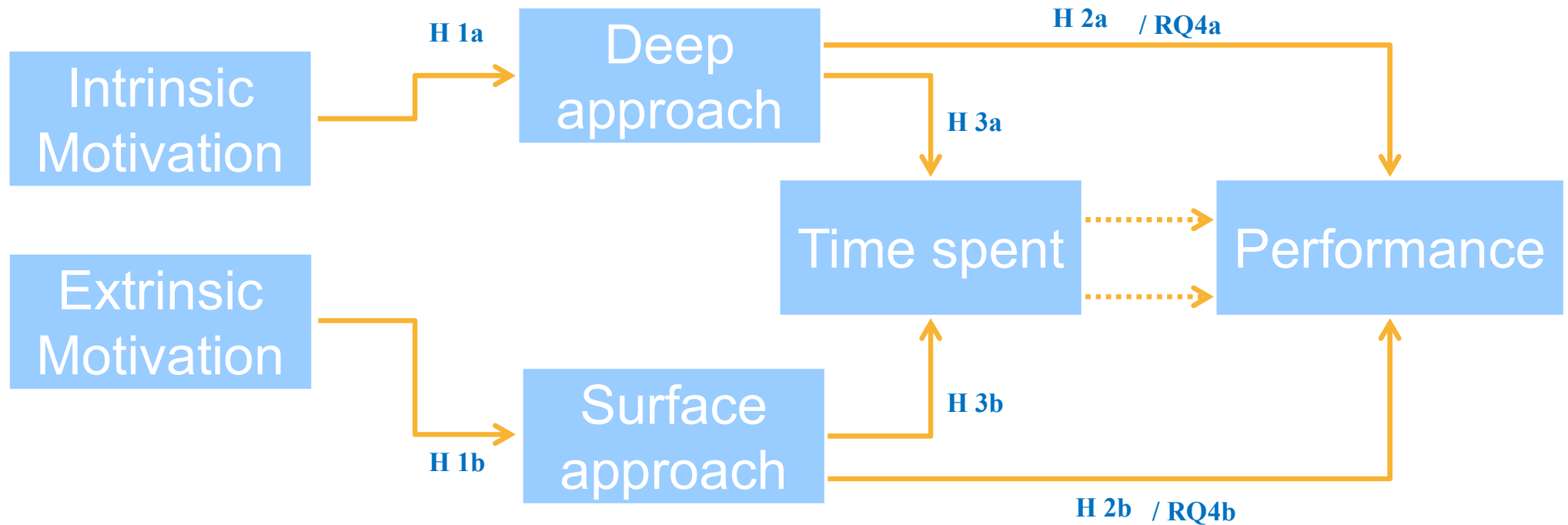


# Learning approach -> Performance (while controlling for Time Spent)

RQ4a: Does the **deep learning** still result in higher academic **performance (H2a)**, when taking into account the time spent by the students.

RQ4b: Does the **surface learning approach** still result in lower **academic performance (H2b)**, when taking into account the time spent by the students.

# Hypotheses



\*Control variables: Gender and Ability

# Surveys + records

1st sem

Ability

Advanced accounting

February 2014

Week 1

Week 2

Week 1- Week 12:  
Classes Accounting:  
Theory and tutorials

Motivation

Week 7

Learning approach

Week 12

Time spent

June 2014

Exam Accounting

Performance

2nd sem

- **Dataset:**
  - Academic year 2013-2014
  - First year undergraduate students (N=246)

<b>Variables</b>	<b>Measurement</b>
Ability	GPA previous semester without score for accounting, mark on 480
Gender	0 for male, 1 for female
Intrinsic motivation Extrinsic motivation	MSLQ, Pintrich et al 1991
Deep learning approach Surface learning approach	R-SPQ-2F; Biggs et al 2001
Performance	Score on Acc II; mark on 60
Time spent	Average number of minutes per week

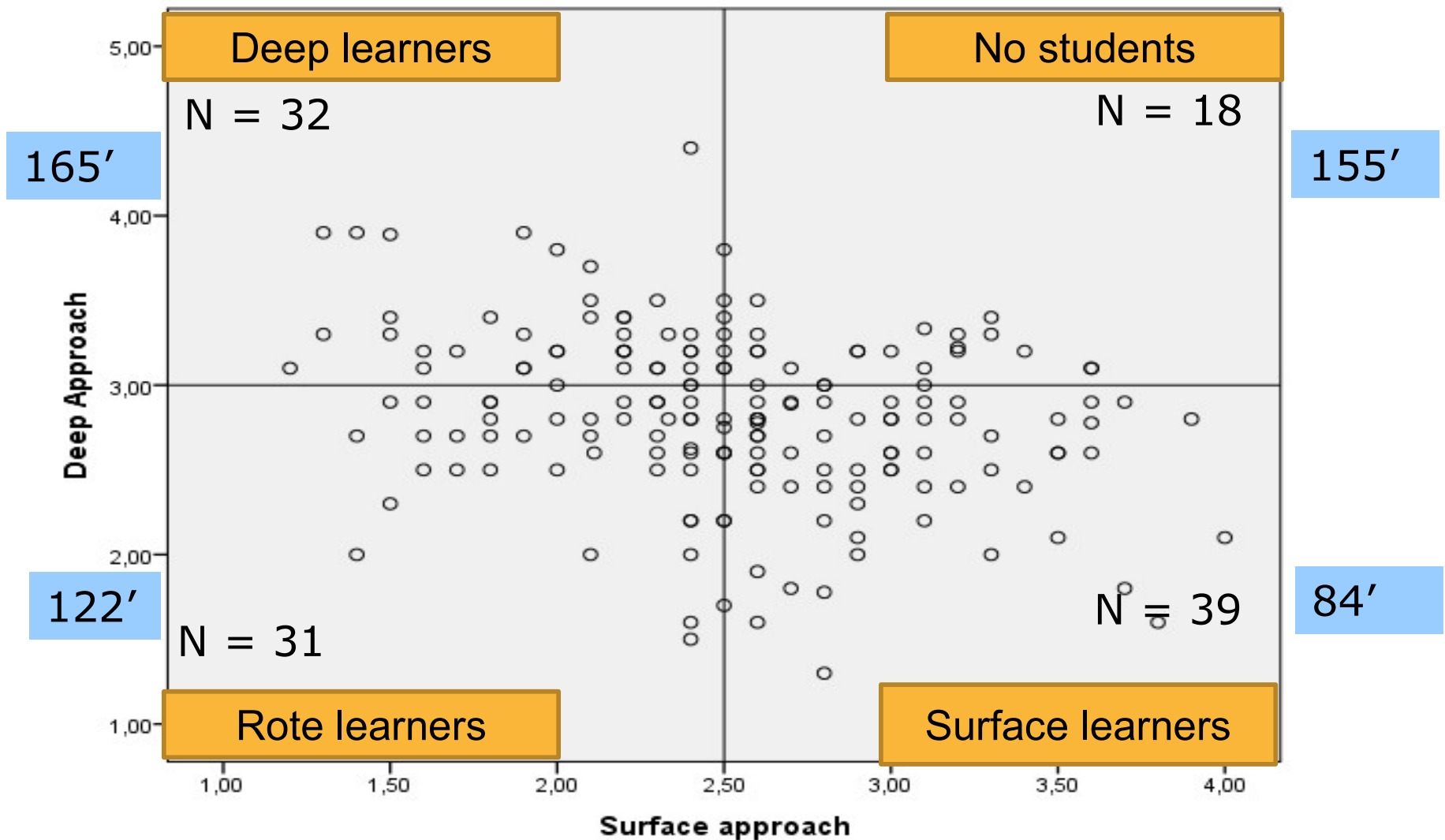
# Descriptives

Variable	Mean	Minimum	Maximum	Standard-deviation	N
Academic performance	29.02	1	60	15.23	388
Intrinsic motivation <sup>a</sup>	4.87	1.75	7.00	.89	328
Extrinsic motivation <sup>a</sup>	4.98	2.25	6.75	.76	328
Deep approach	2.87	1.30	4.40	.50	277
Surface approach	2.45	1.20	4.00	.59	277
Ability	291.63	0.00	390.00	250.16	388
Time spent <sup>b</sup>	142.32	5.00	700	102.07	248

<sup>a</sup> Some students who filled out the questionnaire of the learning approaches did not fill out the questions on the motivation, consequently the number of students dropped for these variables.

<sup>b</sup> This was an open question in the post-questionnaire. Some students did not answer this question.

# Plot learning approaches



## Gender differences

Variable	Mean men	Mean women	t-value <sup>a b</sup>	p-value
Academic performance <sup>c</sup>	28.28	29.95	-1.16	.245
Intrinsic motivation <sup>c</sup>	4.82	4.91	-0.93	.352
Extrinsic motivation <sup>c</sup>	4.92	5.04	-1.35	.179
Deep approach <sup>d</sup>	2.86	2.88	-.50	.621
Surface approach <sup>d</sup>	2.60	2.29	4.58	.000
Ability <sup>c</sup>	251.27	248.77	0.37	.712
Time spent <sup>e</sup>	118.73	166.30	-3.72	.000

ANCOVA	Estimated marginal Mean men	Estimated marginal Mean women	F-value	p-value
Academic performance	28.12	30.16	4.201	.041

# H1: Motivation

Variable	t-value	p-value
Constant	2.35	.020
Intrinsic motivation	7.53	.000
Extrinsic motivation	4.27	.000
Ability	2.72	.007
Gender	-0.58	.560

## Model summary

Dependent variable	Deep approach
F (model)	26.852
p-value (model)	.000
Adjusted R <sup>2</sup>	.299

Variable	t-value	p-value
Constant	10.73	.000
Intrinsic motivation	-4.061	.000
Extrinsic motivation	0.81	.419
Ability	-2.18	.030
Gender	-4.13	.000

## Model summary

Dependent variable	Surface approach
F (model)	11.722
p-value (model)	.000
Adjusted R <sup>2</sup>	.150



## H2: Performance

Variable		t-value	p-value
Constant		-6.11	.000
Deep approach		3.86	.000
Ability		18.20	.000
Gender		1.46	.144
<b>Model summary</b>			
Dependent variable	Academic performance		
F (model)	119.653		
p-value (model)	.000		
Adjusted R <sup>2</sup>	.566		

## H2: Performance

Variable		t-value	p-value
Constant		-0.90	.369
Surface approach		-2.69	.008
Ability		0.76	.445
Gender		-0.90	.369
<b>Model summary</b>			
Dependent variable	Academic performance		
F (model)	1114.048		
p-value (model)	.000		
Adjusted R <sup>2</sup>	.553		

### H3a: Time spent

Variable	Coefficient	t-value	p-value
Constant		-1.84	.068
Deep approach		3.93	.000
Ability		1.76	.080
Gender		3.50	.001
<b>Model summary</b>			
Dependent variable		Time Spent	
F (model)		10.153	
p-value (model)		.000	
Adjusted R <sup>2</sup>		.120	

### H3b: Time spent

Variable	Coefficient	t-value	p-value
Constant		3.1	.002
Surface approach		-2.508	.013
Ability		1.499	.136
Gender		2.607	.010
<b>Model summary</b>			
Dependent variable		Time Spent	
F (model)		6.898	
p-value (model)		.000	
Adjusted R <sup>2</sup>		.081	

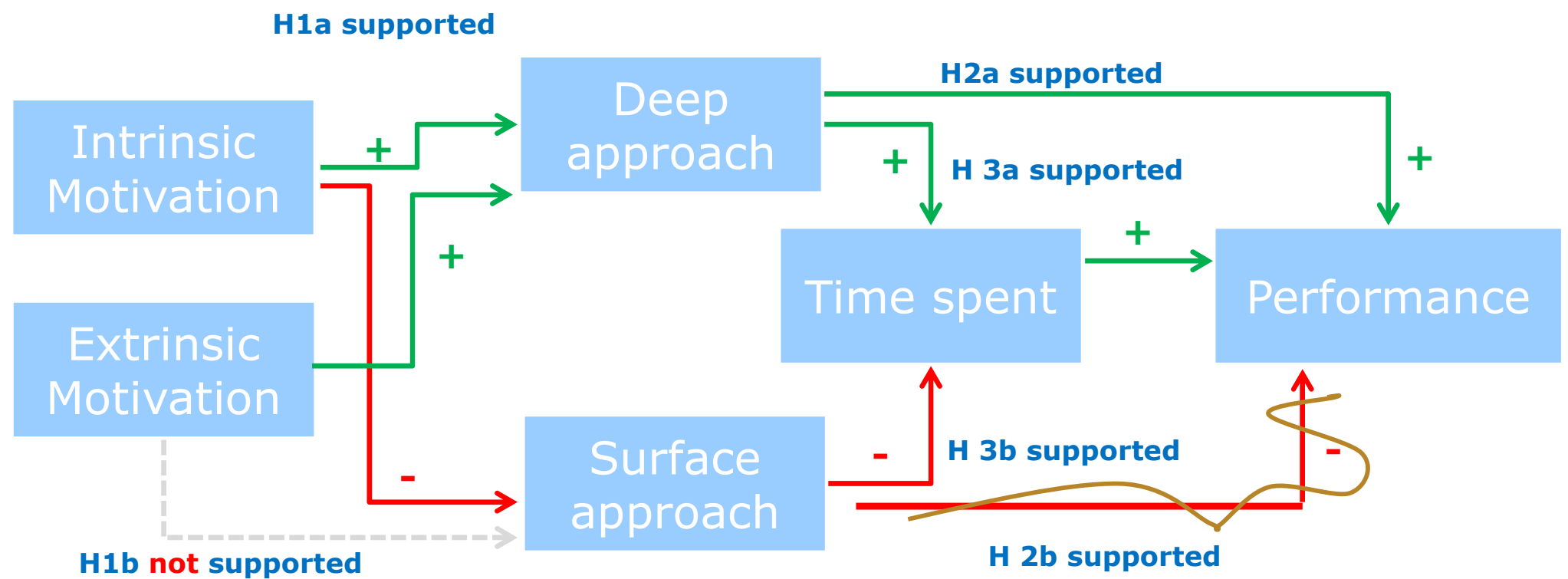
## H4a: Performance

Variable	t-value	p-value
Constant	-5.112	.000
Time spent	2.106	.053
Deep approach	1.948	.036
Ability	15.946	.000
Gender	0.547	.585
<b>Model summary</b>		
Dependent variable	Academic performance	
F (model)	71.187	
p-value (model)	.000	
Adjusted R <sup>2</sup>	.581	

## H4b: Performance

Variable	t-value	p-value
Constant	-2.372	.019
Time spent	2.305	.022
Surface approach	-1.412	.159
Ability	15.504	.000
Gender	0.062	.951
<b>Model summary</b>		
Dependent variable	Academic performance	
F (model)	69.635	
p-value (model)	.000	
Adjusted R <sup>2</sup>	.576	

# Conclusion



\*Controlvariables: Gender and Ability

- Limitations
  - Rather small Cronbach's Alfa for motivation
  - Low number of observations (n=246)
  - Self-reported measures
- Future research
  - Special group: 'Rote learners'
  - How to stimulate deep learning?



## Main contribution

- “You should study differently!”
- Time spent!
- Still impact of deep approach on performance, even when taking into account time spent.



# Take-aways

1. Introduction
2. Literature review
3. Methodology
4. Measurement of variables
5. Results

# Introduction

3 key elements:

- **What** is your research about?
- **Why** is this a relevant question?
- **How** are you answering this question?

# Literature review

Make a table for yourself:

- What has been investigated?
- Variables?

---

<b>Quantitative research</b>				
<b>1</b>	Abhayawansa, Tempone, & Pillay	2012	Australia	Impact of prior learning experience on students approaches to learning
<b>2</b>	Ballantine, Duff and McCourt Larres	2008	Ireland	Investigation into the learning approaches of students who were exposed to case study method.
<b>3</b>	Booth et al	1999	Australia	Effect of learning approaches on academic performance

# Methodology

Consider experimental designs:

- **Pretest – posttest**

Stepwise explanation:

- Consult other papers

# Measurement of variables

Table:

- Items
- Sources
- Chronbach's Alpha
- Factor loadings (factor analysis)

# Measurement of variables

**Table 1.** Factor loadings and Cronbach's alphas MSLQ.

Item	Cronbach's $\alpha$	Factor loading
Intrinsic goal orientation	.61	
1 In a class like this, I prefer exercising material that really challenges me so I can learn new things.	X	.695
2 In a class like this, I prefer exercising material that arouses my interest, even if it is difficult to learn.	X	.615
3 The most satisfying thing for me in this course is trying to understand the exercises as well as possible	X	.759
4 I prefer to make the exercises at home before the exercises become available on Minerva, even if I do not gain extra grades for this. (*)	X	.627
Extrinsic goal orientation	.53	
1 Getting a good grade in this class is very important for me. (*)	X	.600
2 The most important thing for me right now is improving my overall grade point average; so my main concern in this class is getting a good grade.	X	.472
3 If I can, I want to get better grades in this class than I scored for the 'Introductory Accounting' course. (*)	X	.743
4 I want to do well in this class because it is important to show my ability. (*)	x	.706

Note: When there is a '(\*)' after a question, it means that the formulation is slightly different from the original instrument due to translation differences.

# Results

## Descriptives

**Table 3.** Descriptives.

Variable	<i>N</i>	Minimum	Maximum	Mean	Standard-deviation
Academic performance <sup>a</sup> (mark on 60)	388	1.00	60.00	29.02	13.99
Time spent <sup>b</sup>	248	5.00	700.00	142.32	103.24
Intrinsic motivation	328	1.75	7.00	4.87	0.88
Extrinsic motivation	328	2.25	6.75	4.98	0.82
Deep approach <sup>c</sup>	277	1.30	4.40	2.87	0.48
Surface approach <sup>c</sup>	277	1.20	4.00	2.45	0.58
Ability (Mark on 440)	388	68.00	390.00	250.16	66.03



# Results

## Correlation table

**Table 4.** Correlation table.

	Academic performance	Time spent	Intrinsic motivation	Extrinsic motivation	Deep approach	Surface approach	Ability	Gender
Academic performance	1							
Time spent	0.213**	1						
Intrinsic motivation	0.212**	0.361**	1					
Extrinsic motivation	-0.256**	0.228**	0.316**	1				
Deep approach	0.197**	0.263**	0.501**	0.326**	1			
Surface approach	-0.263**	-0.220**	-0.261**	0.040	-0.255**	1		
Ability	0.720**	0.090	-0.010	-0.367**	0.067	-0.176**	1	
Gender	0.060	0.231**	0.050	0.070	0.030	-0.266**	-0.019	1

\*\*Correlation is significant at the 0.01 level (2-tailed).

Good luck!  
Questions?

[Patricia.Everaert@UGent.be](mailto:Patricia.Everaert@UGent.be)

# Different learning approaches (Ramsden, 1992; Ellis et al. 2008)

Deep learning approach



Surface learning approach



## Items Intrinsic motivation (Alpha =,61)

Item	Cronbach's Alpha	Factor loading
<b>Motivational scales (Section 1)</b>		
<b>Intrinsic goal orientation</b>	0.61	
<b>Question 1: In a class like this, I prefer exercising material that really challenges me so I can learn new things.</b>	X	.695
<b>Question 13: In a class like this, I prefer exercising material that arouses my interest, even if it is difficult to learn.</b>	X	.615
<b>Question 18: The most satisfying thing for me in this course is trying to understand the exercises as well as possible</b>	X	.759
<b>Question 20: I prefer to make the exercises at home before the exercises become available on Minerva, even if I do not gain extra grades for this. (*)</b>	X	.627

## Items Extrinsic motivation (Alpha = ,53)

<b>Extrinsic goal orientation</b>	<b>.53</b>	
<b>Question 6: Getting a good grade in this class is very important for me. (*)</b>	X	.600
<b>Question 9: The most important thing for me right now is improving my overall grade point average; so my main concern in this class is getting a good grade.</b>	X	.472
<b>Question 11: If I can, I want to get better grades in this class than I scored for the "Introductory Accounting" course. (*)</b>	X	.743
<b>Question 25: I want to do well in this class because it is important to show my ability. (*)</b>	x	.706

# Items Deep Learning (Alpha = ,76)

Deep approach	0.76	0.76	
1. I find that at times studying gives me a feeling of deep personal satisfaction.	X	X	0.57
2. I find that I have to do enough work on a chapter so that I can form my own conclusions before I am satisfied.	X	X	0.65
5. I feel that virtually any topic can be highly interesting once I get into it.	X	X	0.54
6. I find most new topics interesting and often spend extra time trying to obtain more information about them.	X	X	0.69
9. I find that studying academic topics can at times be as exciting as a good novel or movie.	X	X	0.49
10. I test myself on important topics until I understand them completely.	X	X	0.67
13. I work hard at my studies because I find the material interesting.	X	X	0.69
14. I spend a lot of my free time finding out more about interesting topics which have been discussed in different classes.	X	X	0.45
17. I come to most exercise classes with questions in mind that I want answering. (*)	X	X	0.42
18. I make a point of looking at most of the suggested readings that go with the lectures. (*)	X		0.32

# Items Surface Learning (Alpha = .75)

3. My aim is to pass the course while doing as little work as possible.	X	0.57
4. I only study seriously what's given out in class or in the course outlines.	X	0.55
7. I do not find my course very interesting, so I keep my work to the minimum.	X	0.52
8. I learn some things by rote, going over and over them until I know them by heart even if I do not understand them.	X	0.44
11. I find I can get by in most assessments by memorising key sections rather than trying to understand them.	X	0.50
12. I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.	X	0.58
15. I find it not helpful to study topics in depth. It confuses and wastes time, when all you need is a 10 to pass the course. (*)	X	0.68
16. I believe that lecturers shouldn't expect students to spend significant amounts of time studying material everyone knows won't be examined.	X	0.63
19. I see no point in learning material which is not likely to be in the examination.	X	0.58
20. I find the best way to pass examinations is to try to remember the solution of the exercises. (*)	X	0.48

# Correlations

	Academic performance	Time spent	Intrinsic motivation	Extrinsic motivation	Deep approach	Surface approach	Ability	Gender
Academic performance	1							
Time spent	.283**	1						
Intrinsic motivation	.256**	.338**	1					
Extrinsic motivation	-.205*	0.137	.330**	1				
Deep approach	.259**	.274**	.520**	.324**	1			
Surface approach	-.265**	-.261**	-.218**	0.054	-.278**	1		
Ability	.708**	0.110	-0.004	-.311**	.085	-.221**	1	
Gender	0.044	.198*	-0.031	0.000	-.016	-.228**	0.034	1