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The black box revelation of instructional practices: a mixed study of the transition to HE

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ABSTRACT

Instructional practices (IP) could be an important lever for student's adjustment to the first year at the university. Yet, the role of teaching practices is overlooked in the literature about students' transition to Higher Education (HE). To overcome this limitation, the current study proposes to analyse the link between teaching practices and student achievement controlling for individual variables. More precisely, multi-level analyses were carried out on 932 students scattered on 18 different courses from five universities. Instructional practices were measured through teachers' self-reported questionnaires. The main results highlighted the significant link between instructional support or consideration for students' perspectives and student academic achievement. Moreover, eight focus groups were carried out with students to understand more deeply the role of the teacher in their adjustment to HE. Five major themes emerged from the data: Non-verbal attitudes, Teacher's flexibility and structure, interactive and entertaining lessons and clear and consistent expectations. These results provided several guidelines to improve IP to ease students' transition process to HE.

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First year experience;
learning environment;
academic success;
engagement; teaching

Introduction

A vast body of research demonstrated that the first year at the university is a sensitive phase for students (Coertjens et al. 2017; Trautwein and Bosse 2017). Statistics reveal that dropouts and failures mainly occur across the first year in HE (Heublein 2014). Consequently, there is not only a general concern about study success (Vossensteyn et al. 2015) but also a particular interest in first-year students' transition to HE.

Transition to HE is composed of a large bunch of challenges and requirements which could impede study success (Trautwein and Bosse 2017). During this transition phase, teacher practices and the feature of lectures could be an important lever for student's adjustment to university (Schneider and Preckel 2017). Teachers' practices are important components of students' experience of HE. In that sense, they could have a link with students' achievement.

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Schneider and Preckel (2017) identified instructional practices among the most important predictors of academic success in HE. Quinlan (2019) asserted that lecturing is often touted as a means to inspire students' interest, despite evidence that most lectures fail to do so. Yet, the actual link between teaching practices with students' achievement in HE is often overlooked and most studies focused only on individual predictors (De Clercq et al. 2021). Even though research in HE takes the learning environment into account, studies have mainly looked at the role of conceptions of teaching or particular teaching methods. The dimensions of teaching practices themselves have rarely been linked to success in HE. More precisely, the empirical assessment of the link between instructional practices and academic achievement is still underdeveloped (Duguet and Morlaix 2012; Dupont et al. 2016). More specifically, there is still a lack of detailed empirical studies on the precise role of practice dimensions on success. It is still unclear today how and to what extent instructional practices could play a role in student achievement in the first year at the university.

An interesting step forward in the understanding would be to consider situational and individual variables to predict student achievement (Quinlan 2019). So, investigating the relationship of instructional practices with achievement combined with individual predictors of achievement could be a real impetus towards a better understanding of academic adjustment among first-year university students.

This study intends to address the following questions: What is the relative importance of instructional practices for student success over individual variables (psychosocial and background characteristics)? How do instructional practices precisely relate to student's success?

Students' achievement process in the first year at the university

This study built upon the conceptual framework of the achievement process proposed by De Clercq and colleagues (2018; 2020). This approach is grounded in the self-system model of motivational development (SSMMD; CONTEXT-SELF-ACTION, Appleton Christenson, & Furlong 2008; Reschly & Christenson 2012) and the model of transition cycles (Nicholson 1990). The achievement process model (see Figure 1) posits that student achievement will be directly influenced by their engagement (action), which is energised by their motivation (self), which is in turn impacted by the characteristics of the learning environment (context) and personal characteristics at the entrance of the university (Background).

The model shared several commonalities with the integrated social cognitive theory of career and educational choice (Lent & Brown 2019) and is consistent with Entwistle and colleagues' (2002) conceptualisation of student learning. It is also consistent with the comprehensive approach of Kahu and Nelson (2018) which considers students' success as a complex educational interface (between learning context and psychosocial variables) determining students' engagement. Several empirical studies also highlight the important roles played by students' engagement, motivation and learning environment in their subsequent academic achievement (Van Rooij et al. 2018). This conceptual framing is also consistent with Price's 4P model of student's learning outcomes in HE (Price 2013). This model, focused on the approach to learning, argues that a student's characteristics (Presage) will determine his or her perceptions of the learning context

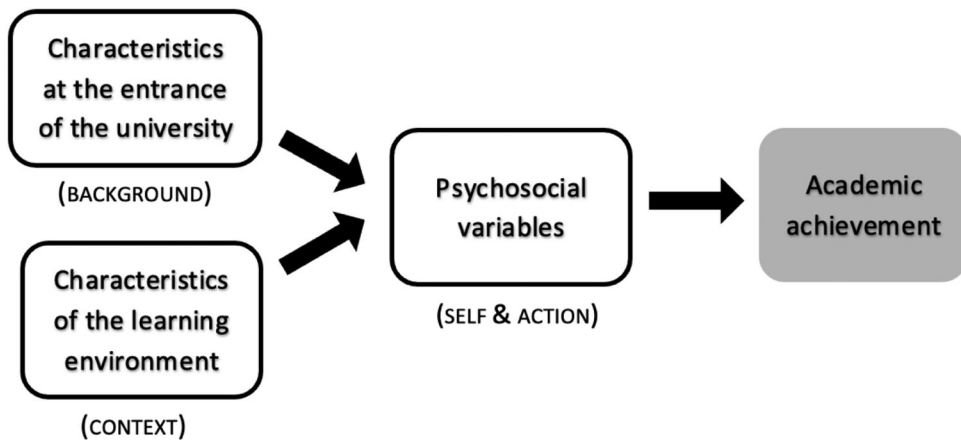


Figure 1. The achievement process model.

(Perceptions) which will in turn influence the student's approach to the learning task (Process) which will finally predict his or her outcomes (Product).

The role of background characteristics

Student background factors (such as gender, age, parental educational level, socioeconomic status, and past academic performance or standardised achievement test score) have been extensively studied in the literature about the first year at university (Van Rooij et al. 2018).

Among those factors, three showed a link with academic achievement: gender, past performance and socio-economic status. Many studies have indicated that women performed better than men in HE (Gayef, Tapan, and Haydar 2017; Ullah and Ullah 2019). Yet, the meta-analysis of Richardson and colleagues (2012) on first-year students estimated very low corrected correlations of these factors with academic achievement (between .03 and .04).

Another line of research tackled students' educational or socioeconomic background. Students from lower socioeconomic status had lower achievement (Rodríguez-Hernández et al 2020; Sirin 2005). Several studies, based on Social Capital Theory (Bourdieu 1986), identified social capital as an explanation of how socioeconomic status is related to academic achievement. Yet, this idea was recently questioned and criticised (Rodríguez-Hernández et al. 2020). The meta-analysis of Richardson and colleagues (2012) estimated a corrected correlation of .15 between SES and academic achievement.

Past academic performance (i.e. secondary school diploma or standardised achievement test scores) has also been an extensive topic of investigation. Four meta-analyses (Poropat 2009; Richardson et al. 2012; Robbins et al. 2004; Sackett et al. 2009) corroborated the stable and important link between past performance and academic achievement (corrected correlation between .20 and .35).

Psychosocial predictors of academic achievement

Based on contemporary educational (e.g. Tinto 1997) and motivational theories (e.g. Eccles and Wigfield 2002), Robbins and colleagues (2004) delimited psychosocial

factors as the motivational, behavioural and social variables at work during the academic year. Several factors were mentioned such as academic self-efficacy beliefs, task value and engagement.

Social cognitive theory (Bandura 1997) claims that confidence in one's ability and chance of success are important in the prediction of achievement. Numerous studies supported the claim that academic self-efficacy is a key factor for student achievement in HE (Ayllón, Alsina, and Colomer 2019; Zysberg and Schwabsky 2021). Beyond its link with academic achievement, several authors (Bong and Skaalvik 2003; Navarro et al. 2019) showed that self-efficacy beliefs foster social integration, intention to persist and engagement, while reducing the perceived stress of college students. The meta-analysis of Richardson and colleagues (2012) and the systematic review of Honicke and Broadbent (2016) identified self-efficacy beliefs as one of the most important predictors of academic achievement (corrected correlation between .28 and .67 depending on the measure used).

Grounded in Expectancy-value Theory (Eccles and Wigfield 2002), task value was also identified as an important motivational construct in the achievement process. Task value can be defined as students' perception of the importance, the utility, the cost and the interest of a task (Eccles 2005). The meta-analysis of Robbins and colleagues (2004) found a moderate link between task value and academic achievement (corrected correlation of .25).

Another line of research focused on the role of engagement. Engagement can be conceived as a three-dimensional construct encompassing behavioural, cognitive and emotional involvement (Eccles 2016). Some scholars showed that behavioural engagement is the most proximal predictor of academic performance (Dupont et al. 2016). In this line, several authors demonstrated that procrastination is a relevant negative indicator of behavioural engagement (Fong et al. 2017; Howell and Watson 2007). The meta-analysis of Schneider and Preckel (2017) found a negative medium-sized link between procrastination and academic achievement. Cognitive engagement refers to *engagement of the mind* (Appleton et al. 2008); to investment in an in-depth and comprehensive understanding of the courses and the matter taught. In the higher education context, cognitive engagement taps deep-processing strategies (Phan 2011), namely thinking activities leading the student to an in-depth understanding of a task. Some authors pointed out (Vermunt 2005; De Clercq, Galand, and Frenay 2013) that the predictive power of deep processing strategies on academic achievement would differ regarding the evaluation and requirements of different courses. Yet, studies are more consistent about the negative link with surface-processing strategies (Schneider and Preckel 2017; Van Rooij et al. 2018). The meta-analysis of Schneider and Preckel (2017) showed a medium negative relation with academic achievement (average Cohen's $d = -0.39$).

Finally, emotional engagement refers to the 'engagement of the heart' (Appleton et al. 2008) and can be defined as students' affective reactions when they face an academic task (Pekrun 2006). It, therefore, encompasses positive and negative emotions felt while studying and attending lecture classes. The relation of emotions with achievement in higher education has mainly been studied in relation to negative emotions (e.g. anxiety, fear, and shame). Several authors (Daniels et al. 2008; Pekrun, Goetz, Titz, & Perry; 2002) highlighted that negative emotions are negatively linked with the use of deep processing strategies and – to a lesser extent – with academic achievement. The

meta-analysis of Schneider and Preckel (2017) reported a medium-sized negative link between anxiety and academic achievement (average Cohen's $d = -0.28$).

Learning environment: a conceptual framing of instructional practices in HE

Several studies investigated the link of instructional devices with student academic achievement in HE (Alfieri et al. 2011; Freeman et al. 2014; Roberts 2019). For example, some positive relations were found when comparing traditional lecturing to task-based learning (Bi et al. 2019; Chen and Wang 2019), flipped classroom design (Erhardt and Lim 2020), interactive teaching (Miles 2019) or inquiry-based learning (Lukose and Mammen 2018). McCance and colleagues (2020) used the Teaching Dimension Observation Protocol (TDOP) to compare students' behaviours in a traditional lecturing class or in classes revised to incorporate active learning pedagogies. Their results showed more interactions and active engagement of the students in the revised classes.

Yet, these studies mainly focused on global instructional devices and left the investigation of the specific teaching practices out of the picture. This approach leads to global educational recommendations but does not provide precise levers for the teachers to improve their instructional practices without having to change the whole teaching approach (Rey 2017).

Other studies focused on students' perceptions of instructional practices and their role in academic achievement. Some empirical research studies used the Course Experience Questionnaire (CEQ) and found that students' perception of good teaching (clear goals and standards, appropriate assessment, and emphasis on independence) were positively related to their academic achievement and engagement (Haghgoo et al. 2019; Lizzio et al. 2002; Yin, Lu, and Meng 2022). Sun and Richardson (2016) showed that perceptions of good teaching were positively associated with students' satisfaction with their programmes and with deep learning strategies. Yet, the notion of good teaching remains global and aggregates several teaching practices. De Clercq and colleagues (2021) highlighted that the more the teacher was perceived as supporting deep learning and cognitive activation over social comparison, the more the student achieved academically. Yet, Esterhazy and Gijbels (2021) criticised the subjective nature of students' perceptions to assess instructional practices and questioned their methodological relevance to operationalised educational context. Others support their relevance for this purpose, but only when used aggregated at the appropriate level (Marsh et al. 2012).

Some research studies tried to overcome this limitation by proposing teacher-centred measures of instructional practices in HE. Some studies focused on the Approach to Teaching Inventory (ATI, Prosses & Trigwell 1999) and supported that a student-centred approach to teaching was related to students' deeper approach to learning and better learning outcomes (Trigwell and Prosser 2020). Duguet (2015) focused on teacher observation and found that teacher attitudes towards teaching (eloquence, humour, etc.) were correlated with students' academic success.

Studies reviewed above support the idea that instructional practices are crucial components of the learning environment, but all share the two same limitations. First, their results remained very global and based upon aggregated concepts of teaching making it difficult to disentangle the specific teaching practices that support students' success. Second, their approaches mainly lack a strong theoretical model of instructional practices

Table 1. Synthesis of CLASS and TBD frameworks (Jacquemart et al. in press).

Dimensions	Definitions
1. Socio-emotional support	
○ Consideration of students' perspectives	The teacher allows choice, is sensitive to students' needs/ feelings and encourages students ideas to give their opinion
○ Teacher proximity	The teacher generates a positive climate (positive affect, respect, proximity), gives constructive feedback and encourages students. The teacher provides a constructive approach to error, and has a positive communication
2. Classroom Organisation	
○ Discipline management	The teacher uses strategies to prevent misbehaviour and promote compliance
○ Productivity	The teacher maximises learning time and avoids disruption
○ Participation management	The teacher uses strategies to maintain students' attention, to enhance interest and to promote their active participation
3. Instructional Support	
○ Differentiated support	The teacher adjusts pacing to specific difficulties of the students, ensures that every student understands, takes time to answer specific questions
○ General support	The teacher has a clear language and has clear expectations. He provides a structure.
4. Cognitive Activation	
○ Higher-order thinking	The teacher questions the students, asks for justification and proposes problem resolutions
○ Metacognition support	The teacher asks the students to explain their way of thinking, to think out loud, take time before giving the solution to a problem.

(Hora 2015). HE literature still lack a strong and convincing model of instructional practices in HE. To compensate for this limitation, several theoretical frameworks can inspire our conceptual framing of instructional practices. The literature on instructional quality addressing the question of mandatory education has strong theoretical grounding and strong empirical validation (Baumert and Kunter 2013; Kunter et al. 2013; Pianta, Hamre, and Allen 2012; Praetorius et al. 2018). Two models are particularly relevant (1) the Classroom Assessment Scoring System (CLASS; Hamre & Pianta 2007) and the Three Basic Dimensions model (TBD; Klieme et al. 2001).

The recent work of Jacquemart and colleagues (2023) proposed an integrated model of instructional practices adapted to HE. This model of instructional practices was mainly based on TBD and CLASS. It identified 4 main dimensions of instructional practice described in Table 1. These dimensions fit with the conclusion of a recent literature review about teacher effectiveness in higher education (Mastrokoulou et al. 2022). This review defined teacher effectiveness as the motivator of students (included in classroom organisation), facilitative teaching (drawing near the notion of socio-emotional support), transmission of structured knowledge and promotion of understanding on the part of students (instructional support) and generating conceptual change and intellectual development in students (cognitive activation). Yet this taxonomy still lacks strong empirical validation and needs to be concretely tested in a tertiary educational context.

Based on studies conducted on the CLASS and TBD models, the main dimensions of instructional practice were associated with higher levels of students' achievement (Allen et al. 2013) and showed a significant link with students' interest in a subject (Dorfner et al. 2018; Fauth et al. 2014; Kleickmann et al. 2020). Specifically, socio-emotional support is positively correlated with student engagement (McKellar et al. 2020; Rimm-

Kaufman et al. 2015; Ruzek et al. 2016), performance (Pianta et al. 2008), emotional and motivational development (Praetorius et al. 2018), social skill development (Mashburn et al. 2008), and students' well-being. Classroom organisation has a positive relation with observed behavioural engagement and student-reported cognitive, emotional and social engagement (Reyes et al. 2012; Rimm-Kaufman et al. 2015; Ruzek et al. 2016) and students' cognitive development and performance (Lipowsky et al. 2009). Cognitive activation positively influences students' cognitive development and performance (Lipowsky et al. 2009). In addition, some dimensions of instructional practices could reduce achievement gaps related to students' social background and prior performance (Bissonnette et al. 2010). For example, instructional support and socio-emotional support predicted reduced achievement gaps in mathematics acquisition (Crosnoe et al. 2010).

Aim of the study

The study aimed to investigate the role of instructional practices on students' success in their first year at the university using a mixed method design. Several authors asserted that the complementary perspectives of quantitative and qualitative designs allow for an in-depth investigation of the question (Creswell and Creswell 2017; Mertens 2019).

The quantitative analyses aimed at assessing the predictive power of instructional practices over individual characteristics. Based on above mentioned research, we can postulate that past performance, self-efficacy beliefs and behavioural engagement will remain significant predictors of academic success while including instructional practices in the predictive model. Among instructional practices, we made the hypothesis that instructional support and participation management will be the most predictive of academic success.

The qualitative analysis aimed at answering the following research question: 'How do instructional practices precisely relate to student's success?' Based on the achievement process framing proposed above, we imagine that the role of instructional practices will be depicted as direct and indirect. The role of several practices will certainly be described as passing through motivation, engagement and well-being.

Method

Participants and procedure

A mixed-method study was used. The study was approved by the institutional review board of the university, and the anonymity and confidentiality of the data were ensured. Informed consent was systematically gathered for all students and teachers.

First, a multilevel analysis will be endorsed using teachers' self-reported measures of instructional practices and students' self-reported measures of psychosocial (self-efficacy beliefs, course value, procrastination, emotion and approach to learning) and background characteristics (gender, socioeconomic status and past performance). The links between those factors and student's performance in the course at the end of the year will be analysed (Grade Point Average). Self-reported data were collected by online questionnaires before the exam session. The analyses are carried out over more than 932 first-

year students distributed into 18 courses from five Belgian universities. To promote homogeneity in the courses, the lessons selected were all lecturing. Specific pedagogical designs such as flipped classroom, problem-based learning or practical exercises were left out of the pictures. Yet, the courses selected were from different disciplines: Psychology and Educational Sciences, Economical, Social, and Political Sciences, Mathematics, Biology, Chemistry, Physics, Architecture and Urbanism and Management Sciences.

Second, eight focus groups were carried out with groups of five students who participated in the first data collection. These students were contacted at the beginning of their second year at the university. They were chosen on a voluntary basis while trying to maximise gender, university and course diversity in the composition of each focus group. The interviews lasted around 90 min and questioned the students on their retrospective experience of the first year at the university and the role of instructional practices in their academic success, following the guidelines proposed by Willig (2013). The 40 participants were composed of 60 per cent of females and distributed over the five Belgian universities. Focus groups are a relevant frame of investigation as 'it is through consideration of our experiences in relation to those of others that we make sense of the world' (Lamb and Cogan 2016, 477).

Together the two approaches provide a complementary perspective on the instructional practices. The quantitative approach provides a combination of teachers' and students' perceptions during the lesson. It allows us to estimate the relationship of the different dimensions of instructional practices described above with academic achievement. The qualitative approach provides a retrospective student perspective on the lessons. It allows us to specify and exemplify the specific role of instructional practices and how they had a role in students' achievement process.

Measures

The first questionnaire was addressed to the teachers and assessed instructional practices and course characteristics. The questionnaire on instructional practices was adapted from the work of Jacquemart and colleagues (in press). Thirty-two items were administered to the teachers to ask them about their uses of instructional practices using a Likert scale rating from 1 (Never) to 5 (Very extensively). Six components of instructional practices emerged from exploratory factorial analyses (see Table 2). Socio-emotional support was divided into two dimensions, namely: Consideration for students' perspective and teacher's proximity. Classroom organisation was divided into two components: Productivity & discipline and Participation management. Instructional support and Cognitive Activation failed to be subdivided into specific subfactors. Internal consistency was satisfactory for all factors. Cronbach's Alphas of the different dimensions ranged from .74 to .87.

The following information regarding course characteristics was also collected: average class size, number of ECTS of the course, teacher seniority and use of interactive activities. For the last measure, teachers were asked to report the frequency of use of interactive activities within their course: i-clickers, videos, moments of debate, lab equipment, etc. The 5 items allow us to compute a scale with satisfactory reliability indices ($\alpha = .65$).

The second questionnaire was addressed to the students and measured background and psychosocial variables. Students reported their gender (0 = male; 1 = female) and

Table 2. Instructional practices scales details and reliabilities.

Scale	Construct	n items	Sample item	Cronbach α
Socio-emotional Support	Students perspective	6	To what extent do you ask for students' opinions during the lesson?	.78
	Teachers proximity	3	To what extent do you give supportive feedback to students, even in case of obvious errors?	.87
Classroom Organisation	Productivity & discipline	4	To what extent do you attempt to maximise the effectiveness of lecturing time?	.74
	Participation management	4	To what extent do you make an effort to make the lesson interesting and meaningful to students?	.85
Instructional Support		6	To what extent do you take the time to resume the main ideas of a chapter before moving to the next one?	.79
Cognitive Activation		8	To what extent do you ask students to investigate problems/questions and to generate their own ideas/solutions/opinions about them?	.82

Notes: Subscales ranged from: 1: Never; 2: A few; 3: Moderately; 4: A lot; 5: Very extensively.

their high school grade (Average mark – out of 20 – at the end of secondary education). Their socioeconomic status was measured through a computed score of the highest educational level of the parents and showed a satisfactory reliability coefficient ($r = .46$).

The psychosocial variables questionnaire encompassed variables that characterised students' motivation and engagement in the course during the academic year. Scales were adapted from Galand and Frenay (2005). Students answered on a five-point scale. Self-efficacy beliefs were measured through fourteen items (e.g. 'As long as I do my work, I'm sure I can succeed this course'; $\alpha = .90$). Course value was assessed through nine items (e.g. 'I am really interested in this course' $\alpha = .83$). Procrastination was measured through 4 items (e.g. 'I have difficulties getting started to work and study for this course; $\alpha = .72$). Nine items tapped deep approach to learning (e.g. 'when I am studying for this course, I try to connect what I learn with what I already know'; $\alpha = .82$) and six tapped Surface approach to learning (e.g. 'when I am studying for this course, I try to learn word by word the content of the lessons'; $\alpha = .77$). Finally, positive emotion was assessed through 4 items (e.g. 'During the lesson or when I think about it, I feel happy'; $\alpha = .77$).

Results

Multi-level analysis

Unless explicitly stated, we performed all statistical analyses using the *Mplus* 8. To avoid the common problem of ignoring that random effects are correlated with the regressors, cluster means of the level 1 explanatory variables were introduced as controls. To do so, we followed Antonakis and colleagues' (2021) guidelines for Correlated Random Effects Modelling Approaches. The progressive introduction of the variables in the model followed the temporal unfolding of the theoretical model (background→context→ self). First, an empty model was run to estimate the proportion of between programmes variance. Next, in Model 1, background characteristics were entered at an individual level. In Model 2, study programme characteristics were added at level 2. In Model 3, instructional practices were introduced at level 2. In Model 4, psychosocial factors were added to the model at the individual level. The results are described in Table 3.

Table 3. Multilevel modelling of students' achievement.

	Model 1		Model 2		Model 3		Model 4	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	11.62***	0.61	11.61***	0.52	11.52**	0.33	11.47***	0.20
1. Background variable (Level 1)								
Gender	0.02	0.04	0.03	0.04	0.03	0.04	0.02	0.03
Past performance	0.29***	0.05	0.24***	0.03	0.22***	0.03	0.18***	0.02
Socioeconomic status	0.14***	0.03	0.18***	0.04	0.19***	0.04	0.17***	0.02
2. Teaching environment (Level 2)								
a. Course characteristics								
Number of Students			−0.02	0.25	−0.03	0.21	−0.08	0.23
Number of ECTS			−0.18	0.23	−0.19	0.20	−0.12	0.26
Teacher's seniority			−0.18	0.19	−0.17	0.13	−0.15	0.12
Active teaching supports			0.35**	0.14	0.33**	0.19	0.36**	0.14
b. Instructional practices								
Socio-emotional Support								
Students perspective					0.36**	0.18	0.33**	0.12
Teacher proximity					0.20	0.21	0.13	0.12
Classroom Organisation								
Productivity and discipline					−0.24*	0.13	−0.22*	0.10
Participation management					0.22*	0.15	0.15	0.18
Instructional Support					0.47***	0.15	0.49***	0.14
Cognitive Activation					0.12	0.23	0.11	0.14
3. Psychosocial variables (Level 1)								
Self-efficacy beliefs							0.28***	0.03
Course value							0.02	0.02
Procrastination							−0.23***	0.05
Deep Learning							−0.03	0.04
Surface Learning							−0.11*	0.05
Positive Emotions							0.04	0.03
Negative Emotions							−0.04	0.05
R ² Performance Within courses	11.2%		11.2%		11.5%		33.1%	
R ² Performance Between courses	0%		28.2%		65.3%		68.2%	
Loglikelihood	−3650.72		−3521.39		−3422.32		−3264.22	

The null model (Model 0) indicated that 27.5% of the variance (Intra-class coefficient = 0.275) in academic achievement lay between courses. ICC values greater than .10 (10% of variance occurring at the programme level) suggest the presence of enough programme-level variability to support multilevel analyses (Marsh et al. 2012).

Model 1 included background variables. The introduction of these variables covered 11.2% of the within-classroom variance. Past performance was a significant predictor of academic achievement ($\beta = 0.29$). Students with a more privileged socioeconomic background ($\beta = 0.14$) achieved better.

Model 2 added study programme characteristics and covered 28.2% of the between-classroom variance. More precisely, the use of interactive activities was a positive predictor ($\beta = 0.35$).

Instructional practices were added in the third model (**Model 3**) and their correlations on achievement were tested. This model improved the between-classroom variance explanation by 37.1% (total between courses variance explained = 65.3%). Four variables had a significant link to academic achievement. Instructional support ($\beta = 0.47$), consideration for students' perspective ($\beta = 0.36$), productivity & discipline ($\beta = -0.24$) and participation management ($\beta = 0.22$).

In **Model 4**, psychosocial factors were added to the analysis at an individual level. Such variables provided incremental within-classroom variance explanations of 21.6% and 2.9% of between-classroom variance. Three variables had a significant link to academic achievement. Self-efficacy beliefs were related to better achievement at the end of the year ($\beta = 0.28$). Procrastination and surface approach to learning were negative predictors of academic achievement ($\beta = -0.23$ & $\beta = -0.11$). It is also worth mentioning that Participation management lost a significant link to academic achievement. This final model explained 68.2% of between-classroom academic achievement variance and 33.1% of within-classroom variance. Yet, those last results need to be considered with caution because relative reported variances in consecutive nested models tend to overestimate the explained variances (Nakagawa, Johnson, and Schielzeth 2017).

Focus groups

Data analysis was embedded in a critical realist epistemological stance to get as close as possible to the research participant's experience and to interpret it to further our understanding of the investigated phenomena (Willig 2013). Thematic analysis was used according to Braun & Clarke (2006) guidelines. In this analysis, the transcripts were read and emerging codes were identified independently by two experts. Memo-writing was used to spot the extracts difficult to interpret. Coding was compared, double-checked and discussed to reach a mutual agreement and to refine the definitions of the codes (Braun & Clarke 2006).

Five major themes emerged from the data: Teacher's care, Non-verbal attitudes, Teacher's flexibility and structure, an interactive & entertaining lesson and clear & consistent expectations.

Teacher's care

A theme identified among all the focus groups was teacher's care. Students really expressed the importance for them to be encouraged by the teacher, to receive positive feedback and to feel that they are in a positive climate where error is accepted and they feel comfortable to ask questions. Students reported that the teacher's care supports their success mainly by pushing them to engage actively in the lesson and in a 'try and learn' process.

I remember one of our teacher who often said « I know this moment of the year is difficult for you so I really would like to know how you are doing right now»[...] The simple fact to know that your teacher cares about you and is aware of our difficulties gives you the motivation to attend the course, to involve in it and to talk with him. (FG4: L. 586–587 & L. 608–609)

On the contrary, several students identified the difficulty of being in a competitive/elitist climate where the teacher really emphasised on high failure rate of the course or the large proportion of dropouts during the first year at the university.

Non-verbal attitudes

Another main theme that emerged from all the focus groups was the teacher's attitude. Students really highlighted that the quality of a lesson was not only a matter of content,

teaching features and teaching practices but it was also a matter of how the lecture is given. Several students really emphasised the importance of the teacher's eloquence (tone variation), charisma (humour) and passion for the content of the lesson. They explained that this passion was contagious and really helped them to get involved in the lesson and to follow the line of reasoning of the teacher.

The simple fact that you have a teacher who loved her lesson, she was so passionate by the course. As for me it was enough to attend the course, for being involved and to interact with her during the lesson. [...] The more the teacher was charismatic in her way of speaking, of animating the lesson, the more I paid attention to the lesson. (E2 ETU1: L.442–443 & L.712–714)

According to them, it is a real lever for understanding, motivation and engagement during the lesson. On the contrary, students also reported the monotonous attitude of the teacher as a main difficulty for their understanding and involvement in the course.

The main difficulty was that this teacher just « threw up » his lesson, I mean he just read his slides, he read the syllabus. it was a major source of discouragement for me. [...] Moreover, he had a monotonous voice and suddenly the lesson was hyper boring to listen. (FG1: L.208–211 & L.764–765)

Teacher's flexibility and structure

Several students also identified the importance of teachers' flexibility for their success. Those students explained that what really help them to understand the content of the lesson and to achieve was the consideration of the teacher of their difficulties. They reported that a teacher who takes time to ask students for their understanding, doesn't hesitate to take more time on a difficult notion and explains and re-explains the lesson in other words is positive to gain confidence and to deeply understand the lesson.

One of our teachers was like a dad. [...] When he asked question and we weren't able to answer, he really took the time to help us. He asked us all the time if we had questions, He told us that it didn't bother him to re-explain, that it was an entire part of his job. That was really helping. (FG2: L.459–463)

Moreover, students also emphasised the importance for the teacher to adopt a level of language which is adapted to their actual level of understanding. Some students reported that some lessons were really difficult because the teacher directly used very technical 'jargon' without taking time to explain some complicated words he/she used.

For him, everything that he said made sense, it was crystal clear according to him. So he just went full speed ahead with no brakes [...] That was a teacher that really didn't adapt to our level of understanding... (FG 4: L.1034–1039)

The vast majority of the students also reported the importance of the teacher's clarity on their success. Some students told us that it could be the most important dimension of teaching practices. More precisely, they explained to us the importance of having a well-structured lesson, with reminders of the previous lesson, clear transitions between the chapters, and explicit connections between the different notions of the lessons.

An interactive and entertaining lesson

Beyond teaching practices and attitudes, several students also highlighted the importance of the teaching features. They described the importance of having clear and beautiful slides to support teachers' explanations, having some moments of break, having a complete syllabus for the course and having some tasks or exercises to train.

During the philosophy course the teacher talked without break during 2 hours and it was so difficult to follow. I didn't understand anything and decided to stop to attend this course. (FG 7: L.120–121)

Moreover, they also talk about the importance of having several opportunities to interact and to test themselves on their level of understanding during the lesson.

The stuff that really made the difference was, at the end of each hour, the teacher proposed a Wooclap (interactive quiz). It was just some small questions about what we saw, it just last about 15 minutes, but it was really helpful to test myself on the content. (FG 5: L.339–341)

Yet, some students also disagreed and expressed that interaction during the course could be uncomfortable. As for them, it was easier to have an entertaining but fully transmissive lesson which doesn't require them to interact at all with the teacher.

Clear and consistent expectations

Another major theme strongly reported by the students was the consistency between the lesson and the assessment procedure. The students explained that what helped them to succeed was a clear explanation of the expectations and the evaluation format.

As students we learn to adjust to very diverse and various requirements. We learn to adjust to specific expectations of each teacher [...] We are in a context where the teachers expect something very specific from us and we have to meet those expectations because they are the judges of our success. This is the reason why knowing teacher's expectation is so important. (FG 8: L.624–633 & L.640–642)

The more the teacher was clear with the evaluation procedure the better students knew how to adapt to the course. More precisely, they explained that it was of utmost importance that the course structure and tasks were consistent with the evaluation format.

I really struggled to obtain a 10 out of 20 at the exam because it was an MCQ with negative marking on supplementary exercises that were not even included in what we saw during the course. Hopefully, I had old exams from previous year to see what kind of questions were asked by the teacher [...] the evaluation format and the content of the evaluation was not clear at all. This exam was just to 'exterminate' everybody, there was a success rate of 6%. (FG 6: L.236–242 & L. 659–663)

For example, some students explained that it was very complicated for them to engage deeply in a course that asked them to debate and interact during the lessons whereas they perfectly knew that the evaluation was just a multiple-choice questionnaire.

Discussion

The purpose of this study was to investigate the incremental role of teaching practices over individual predictors of academic achievement in the first year at the university. Such findings innovatively contribute to the literature on academic success in the

transition to HE. This discussion will relate quantitative and qualitative findings to provide general feedback on the findings.

What is the actual role of instructional practices on academic achievement?

The mixed study identified three dimensions of instructional practices that had a consistently significant link with academic achievement: Instructional support, Teacher's consideration for students' perspective and Productivity & Discipline.

Instructional support can be related to the major theme 'Teacher's flexibility and structure'. The students highly intertwined the teacher's consideration for the specific difficulties of the student and the general provision of structure & clarity in the lesson as a major lever of success. This finding could explain why we failed to distinguish general and differentiated support among factor analyses. These results are also very consistent with the literature on self-determination theory which highlighted that provision of structure was the most predictive dimension of engagement and academic achievement in secondary education (Hospel and Galand 2016). More precisely, our qualitative findings identified that structure was important in teaching practices and learning resources. Moreover, what characterised effective differentiated support would be the devotion of a significant amount of the lesson to ask for the student's level of understanding and to take enough time to re-explain the misunderstood notions.

The teacher's consideration for students' perspectives can be partially related to the major theme of teacher's care. Yet, this theme also encompasses the dimension of teacher proximity which failed to remain significant when psychosocial variables were introduced in the model. These results also highlighted the importance of interactions initiated by the teacher but at a different level. While teachers roused interaction with students on their understanding of differentiated support, they encouraged interaction about their feelings in this dimension. These results showed the importance for the students to feel that they are valued and respected by the teacher. This feeling can satisfy their need for belonging as expressed in the self-determination theory (Ryan & Deci 2020).

The negative link between productivity or discipline and academic achievement was surprising considering that it was a positive relation in secondary education (Rimm-Kaufman et al. 2015; Ruzek et al. 2016). A line of explanation could come from the qualitative results. Students highlighted the negative role of a teacher that does not adjust pacing to student level of understanding. They also reported that some teachers seemed unaware of the gap between their perceived clarity of the lesson and students' perception of this clarity. Considering that our measures of instructional practices were teacher-reported, it is possible that a teacher, who reported high productivity in a lesson, was also unaware of the difficulties of the students during this lesson. Cfusion can then occur between the level of productivity and lack of consideration for students' perspective. These results also highlighted the importance of pauses in a lesson which could reduce the cognitive load during a lecture as demonstrated by a recent study (Aalioui, Gouzi, and Tricot 2022). In other words, productivity should not be confounded with a massive provision of information without pauses and without taking time to consider students understanding.

Another dimension of instructional practices showed a significant link to academic achievement in model 3: Participation management. Yet this result needs to be

considered with caution because the correlation disappeared in the final model. The relation between Participation management and academic achievement could, therefore, be explained by individual variables. Participation management draws near the major theme of non-verbal attitudes. More precisely, participation management is a wider concept including the different strategies used by the teacher to enhance participation (such as connecting content to student life, communicating usefulness, etc.). Qualitative results showed that a lot of participation management lies in the teachers' attitudes and their subtle abilities to communicate with eloquence and passion. The importance of teachers' attitudes is mainly underdeveloped but was already suggested by a study using systematic observation of instructional practices in HE (Duguet 2015).

The teaching environment does not reduce to instructional practices

The mixed study highlighted that teaching environments predict students' success beyond instructional practices. More precisely, more than forty per cent of academic achievement variation at the course level can be explained by the course characteristics which are consistent with previous results (De Clercq et al. 2021; Schaeper 2019). More precisely, qualitative and quantitative results support the important role of teaching format. Active teaching support seems to be the strongest determinant of academic achievement. These results can be related to the major theme 'An interactive and entertaining lesson' where the student showed the importance of the tools used by the teachers to reinforce interaction, participation, clarity and interest in the course. These innovative results showed that teaching efficacy does not solely lie in what teachers do but also in what and how they are equipped with effective teaching tools and design. Among the teaching tools, students seem to grant a great deal of importance to the syllabus and the slides. Moreover, they also emphasised in the qualitative results the considerable importance of the evaluation format. The evaluation of the course drives them to adjust their behaviour to comply with the expectations of the evaluation.

Limitation and future perspectives

Among the limitations of the approach, three are particularly noteworthy. First, this study employed teacher-reported measures of instructional practices. However, there are issues with only considering self-reporting IP by teachers. Self-reported IP by teachers is partly biased. These measures could be subject to social desirability bias and subjectivity. Some empirical research shows that there is a gap between self-reported practices and effective practices (Luoto, Klette, and Blikstad-Balas 2023). Several authors suggest that an improved and more objective measure of instructional practices could lie in systematic observation (McCance, et al. 2020). Such measures could improve our understanding of actual instructional practices while avoiding the methodological issue of self-reported measures.

The second limitation is the lack of longitudinal investigation of teaching practices and students' psychosocial variables. It is probable that those variables would fluctuate during the year. This study, therefore, partly missed the dynamic nature of the relationship between teaching practices and students' adjustment to the first year at the university (Esterhazy & Gijbels 2021).

Another limitation of the study is the focus on the direct link between instructional practices and academic achievement rather than considering a mediation analysis. This methodological choice was made to reduce the complexity and the length of the paper which is already composed of a multi-level analysis and a qualitative approach using focus groups. According to most models of the achievement process, the link with the teaching environment is mainly indirect, passing through motivation and engagement (De Clercq et al. 2018; 2020). Such complex relation was also identified in the focus groups. Students often explained that instructional practices had a positive link with success because they kept them motivated and involved in the lesson. A major future perspective would, therefore, be to investigate the multivariate impact of teaching practices on the entire achievement process. In that perspective, some practices, such as cognitive activation and teacher proximity, could emerge as strong predictors of deep processing learning or positive emotions. Performing SEM analysis combining multi-level analysis could constitute a very promising future perspective.

Practical implication

From a practical point of view, this approach to instructional practices has a strong potential to guide teachers' professional development. The analysis and the reporting of the specific links between teaching practices and students' achievement process could be a major step forward in the issue of academic achievement at the university. For example, confirmed the important role of the provision of structure as it was demonstrated in secondary education. Our findings lend credence to teaching training working on the reinforcement of positive teaching attitudes and teacher flexibility. Such findings could empower the teacher with clear strategies to promote academic achievement. Moreover, it could also provide a new perspective of action to tackle low academic achievement. This study showed the respective and complementary role of individual and context variables on academic success. The academic achievement could be promoted towards an improvement of students' ability to succeed and the creation of a better learning environment with fewer barriers to students' adjustment to the university. Therefore, we suggest that the investigation of the specific dimensions of instructional practices deserves more attention in further studies on the first-year experience.

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